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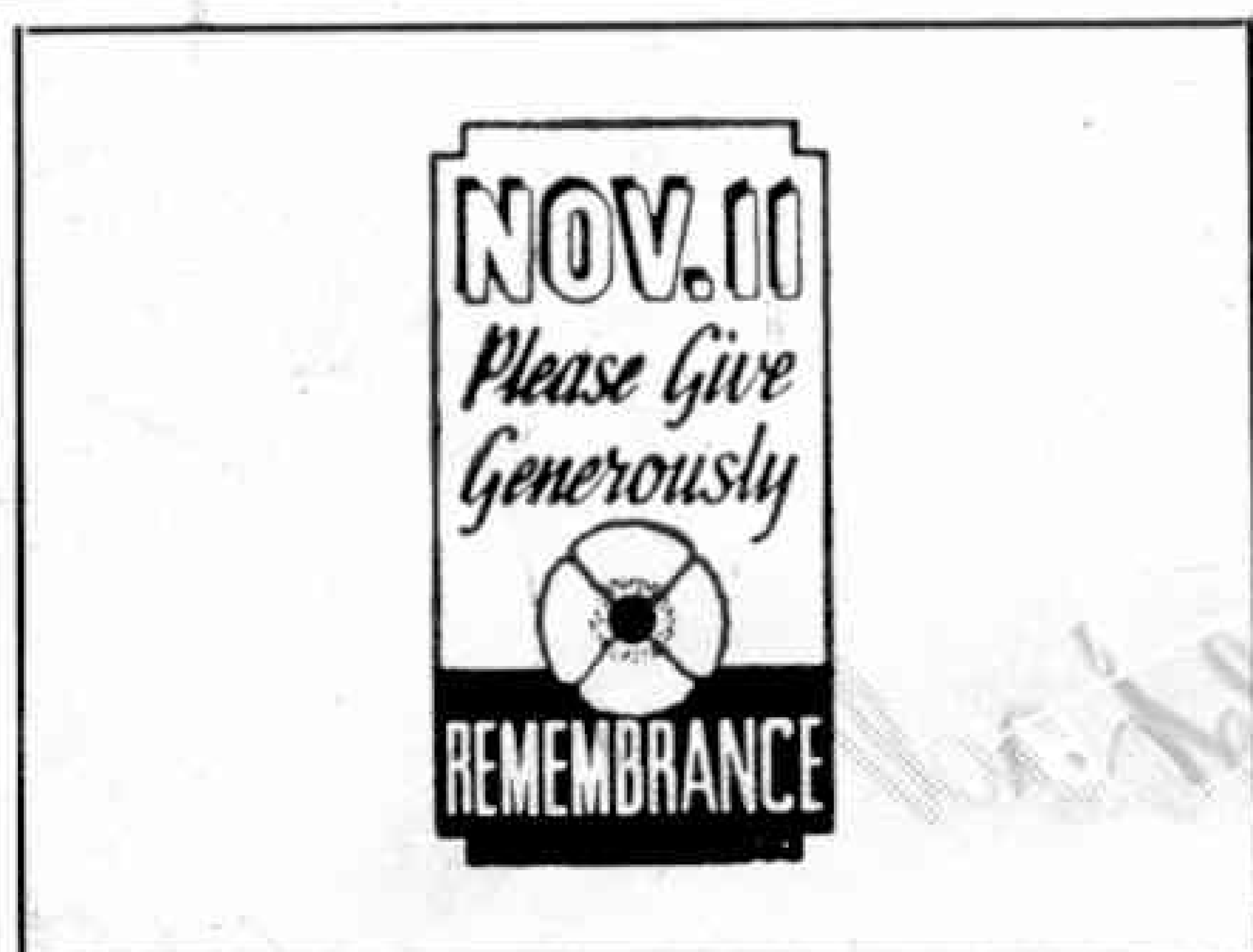
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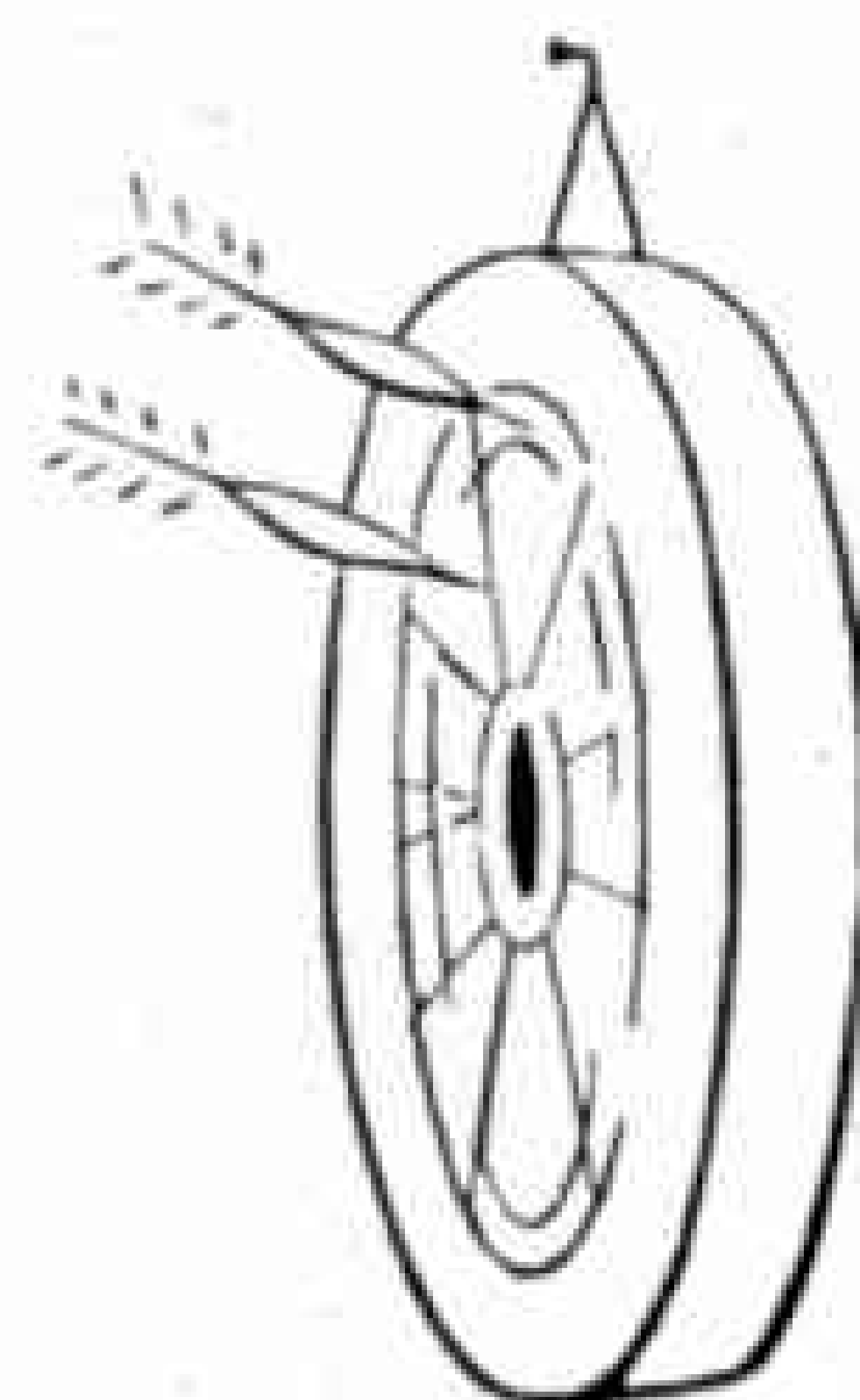
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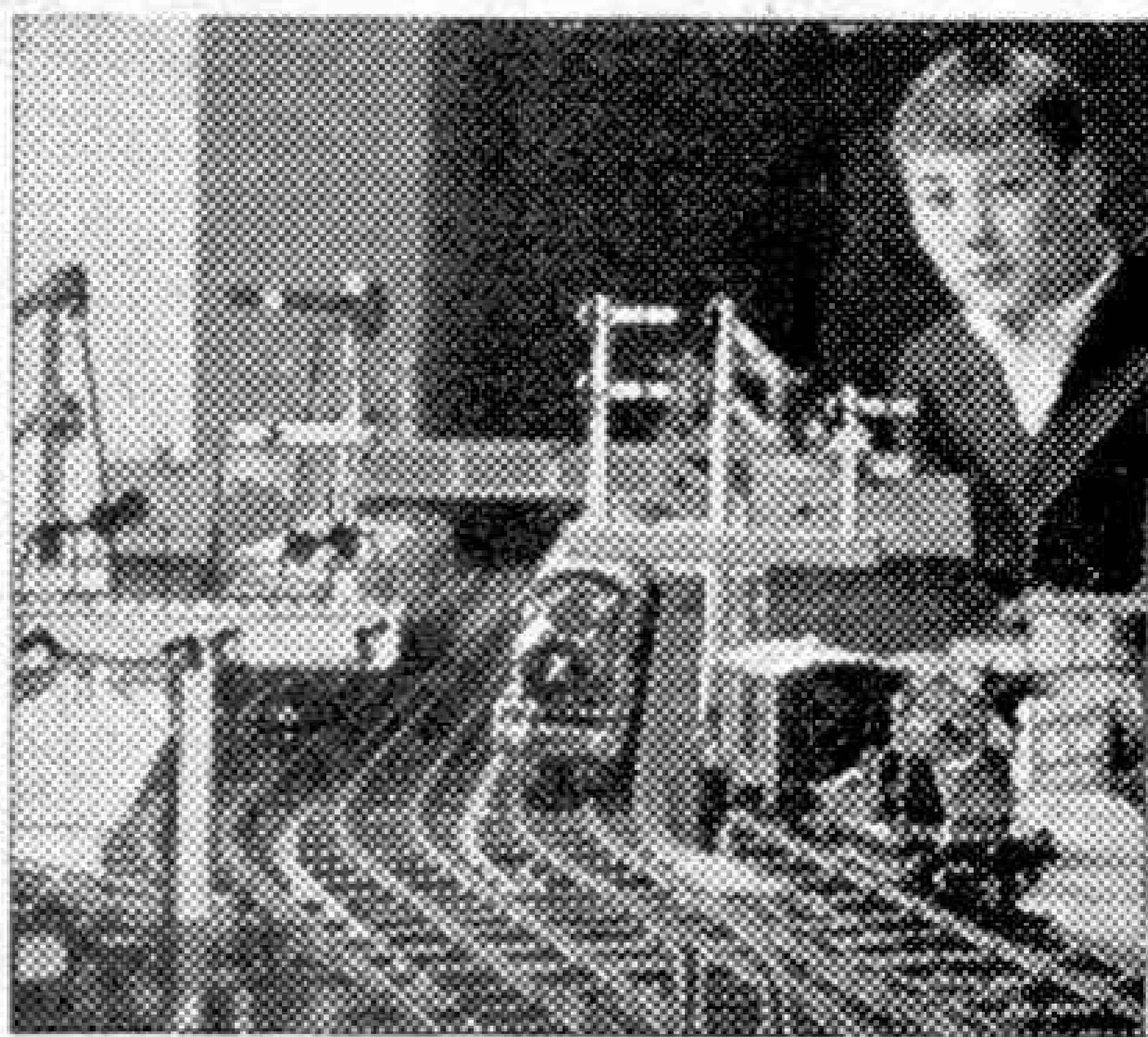
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Next Month: "WAR DOGS AT WORK." By D. Gunston

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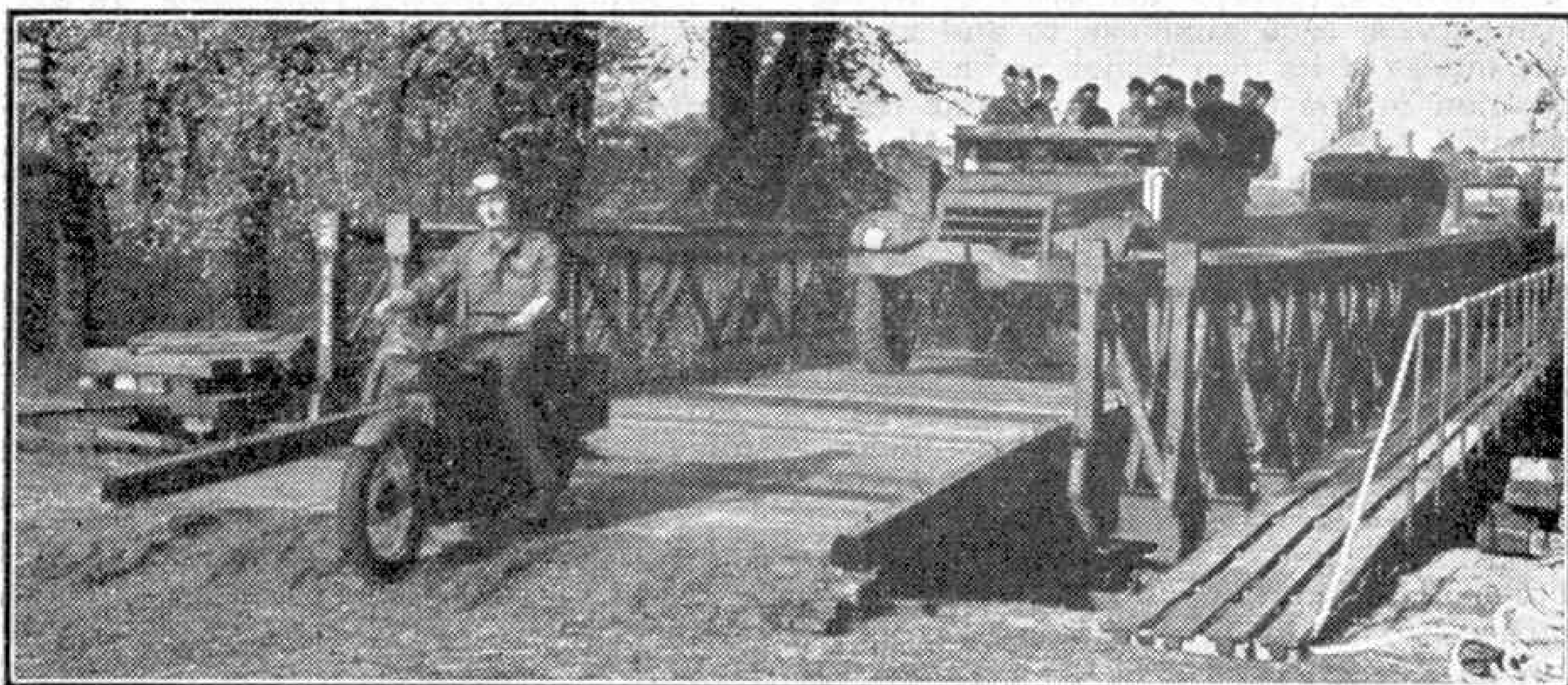
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England

Vol. XXIX

No. 11

November 1944

With the Editor



Bridge Built on Meccano Lines

The accompanying picture shows one of the famous Bailey bridges that have been so helpful to our troops in North Africa, Italy and France. The particular interest of this bridge to readers is that it is built on the lines of a Meccano model—from a set of interchangeable parts.

In its lightest form the bridge can carry a load of 20 tons; this single construction can then be doubled or trebled if required so that the bridge will carry the heaviest tanks. It can cross a gap up to 240 ft. in width without pontoons, and with them it has a much wider range. It is built up from sections 10 ft. long, consisting of 17 parts, the foundation being constructed from nine other parts. The spans are built in succession on rollers on the bank, and then pushed forward by the construction gang. On one occasion in Italy the Royal Engineers bridged a gap of 300 ft. across the Trigno in 36 hours. Pictures showing various stages in the construction of a Bailey bridge are reproduced on page 365.

The bridge is named after Mr. Donald Coleman Bailey of the Ministry of Supply, who took the leading part in its design and development.

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The Air Forces of The United States

I—Naval and Army Air Services

By C. G. Grey

(Founder of "The Aeroplane," 1911, Editor until September, 1939)

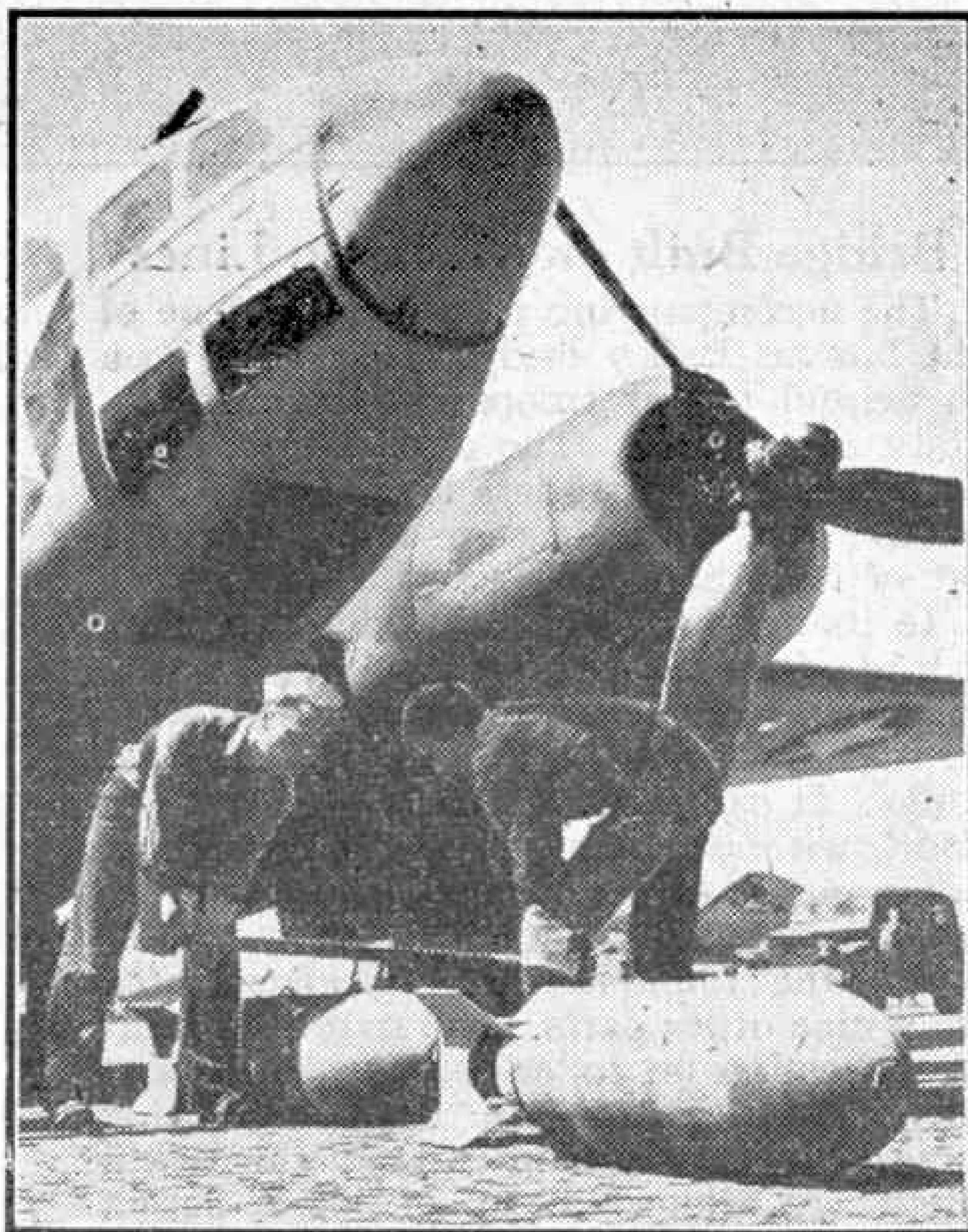
UNLIKE this country, where we have a free and independent Royal Air Force which co-operates with the Navy or Army or carries on a private war of its own—besides having a Fleet Air Arm as a small auxiliary of the sea-going Navy—the United States have two air Services, the U.S. Army Air Corps and the U.S. Naval Air Service, each auxiliary to and under the orders of its own Senior Service. The position in the States is somewhat complicated by the fact that the U.S. Marine Corps, which is under the Navy Bureau but not in the Navy—just like our own Royal Marines—has an Air Corps of its own, and there is also a Coast Guard Air Service, but that need not concern us here.

There is a further complication which I had better explain, because the titles, which are apt to be confusing unless understood, will crop up over and over again. Early in this war somebody in the U.S.A. invented the phrase "Task Force." It is most useful. Any detached body of men, of the land, sea or air, or all three, which is organised under one commander and sent off to do a certain job, or task, is called a Task Force. And likewise any section or detachment which operates as a unit under one command from a fixed base may be called a Force.

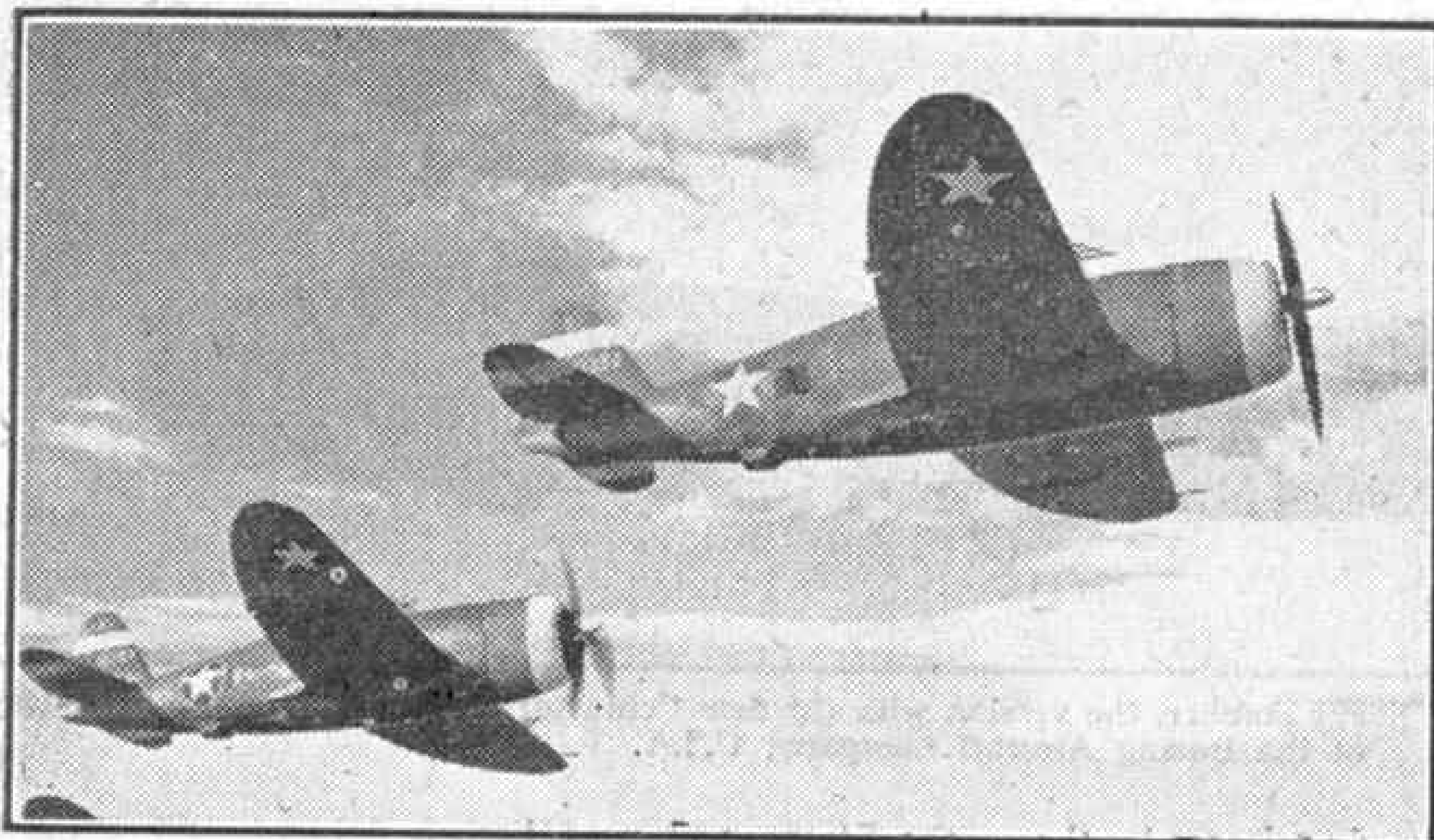
Thus the 8th U.S. Army Air Force is General Jimmy Doolittle's force of heavy bombers operating from England. The 9th U.S.A.A.F. was part of the Allied Expeditionary Air Force—or Tactical Air Forces, under Air Chief Marshal Sir Trafford Leigh-Mallory, R.A.F., until he was appointed to East Asia. The 9th was commanded by Major-General Brereton till he was appointed to command the Allied Airborne Army. The 14th U.S.A.A.F. has grown out of that gallant band of adventurers, known as the "Flying Tigers," who under Major-General Claire Chennault have been putting up a wonderful fight in China against the Japanese, in spite of having more or less obsolete aircraft, and having to do with what supplies can be flown to them "over the hump" of the Eastern Himalayas

from India. And there are lots more U.S.A.A.F.s. sprinkled round the world, up in Alaska, in the Mediterranean, in the Middle East, in the Pacific, and any place where there is any air fighting or air transport to be done.

Then on top of that there are sundry U.S. Army Air Service Commands. In that case Service means giving service to the fighting forces—as understood in that horrid modern word "servicing." These U.S.A.A.S. stations or depots receive new aircraft from the States, modify them to make them warworthy according to modern ideas, repair damaged aircraft, recondition engines, armament, instruments and everything; in fact they do remarkably good service, and without them the Forces would not have any force. As you will see, later on, they are most impressive.



Loading bombs into a Lockheed "Ventura" bomber at a U.S. Navy base in the Aleutian Islands. Official U.S. Navy photograph.



Republic "Thunderbolt" fighters of the U.S. Army Eighth Air Force. Photograph "The Aeroplane" Copyright.

The U.S. Naval Air Service

The U.S. Navy, which is nearly as conservative as is our own Navy, prefers to use the word Service in the good old-fashioned way, as we talk of the King's Fighting Services. But unlike our Fleet Air Arm, which is carried on board ship—although sometimes bits of it are dumped ashore, generally in unpleasant places, to operate over the sea—the U.S.N.A.S. operates the big flying-boat stations, and land-based aircraft which do sea patrols, and fight U-boats, and generally does all the jobs which are done by our Coastal Command R.A.F.

Also the U.S. Navy has a much larger number of aircraft-carrying ships than has our Navy. They started the little Escort Carriers, as they are called officially, "Woolworth Carriers" to the U.S.N. and R.N., uncomfortable little ships from and onto which flying is precarious. But they do the job for which they were designed (or altered). Nobody loves them, except junior officers who are put in command, for every sailor loves the ship which is his first independent command.

The big U.S.N. Carriers are, I am told by those who have served in them, magnificent. They are as big as our biggest and,

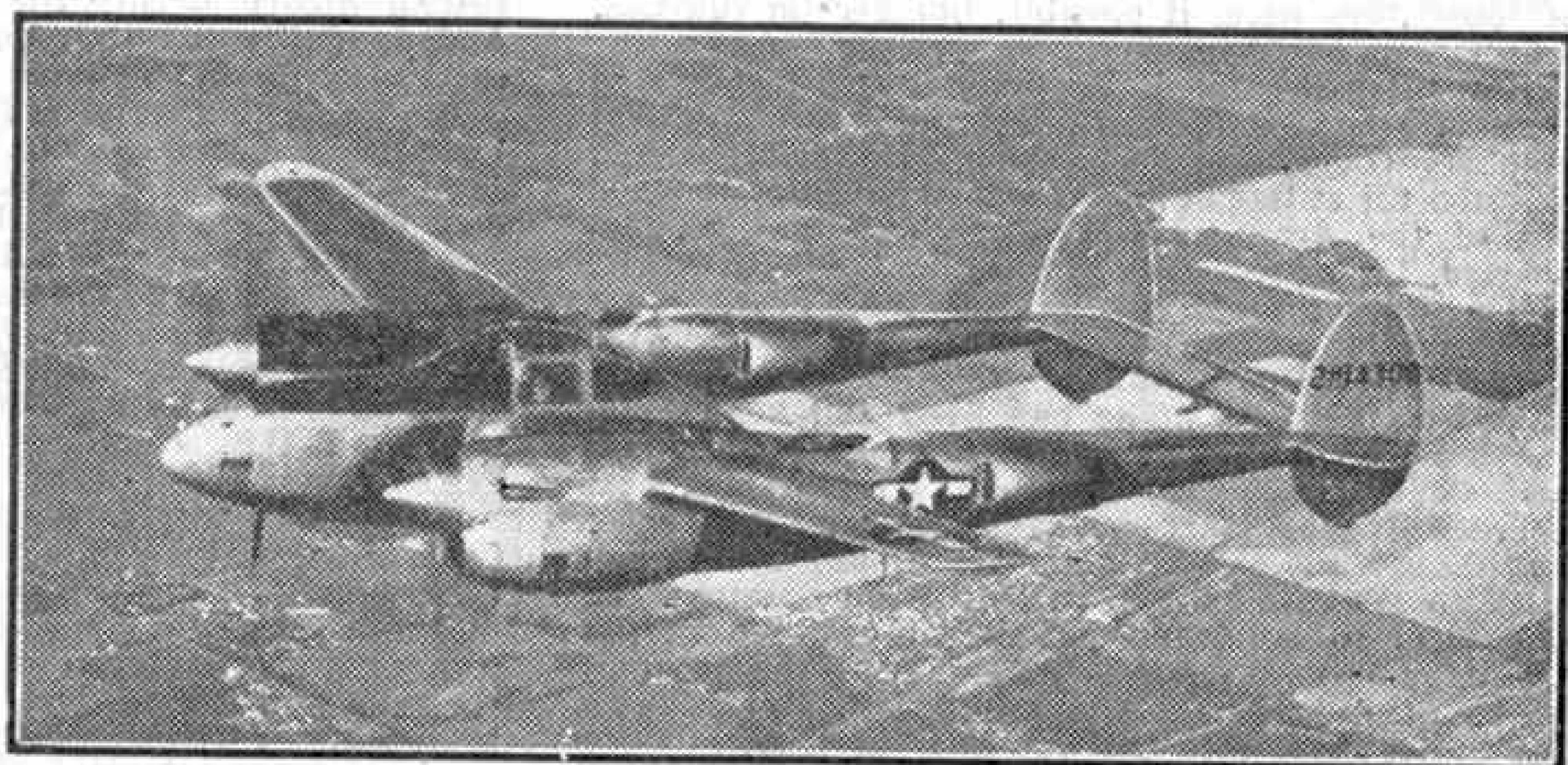
I believe, much better arranged. Instead of wasting thousands of cubic feet of head-room in the "hangars," as they still call the space for aircraft, 'tween decks, the U.S.N. slings its spare machines up to the roof (or underside of the deck above) and so carries about twice as many as we do.

Quarters for officers and men are better than ours. The food is better, and, I am told, better cooked than in the average British ship. But the

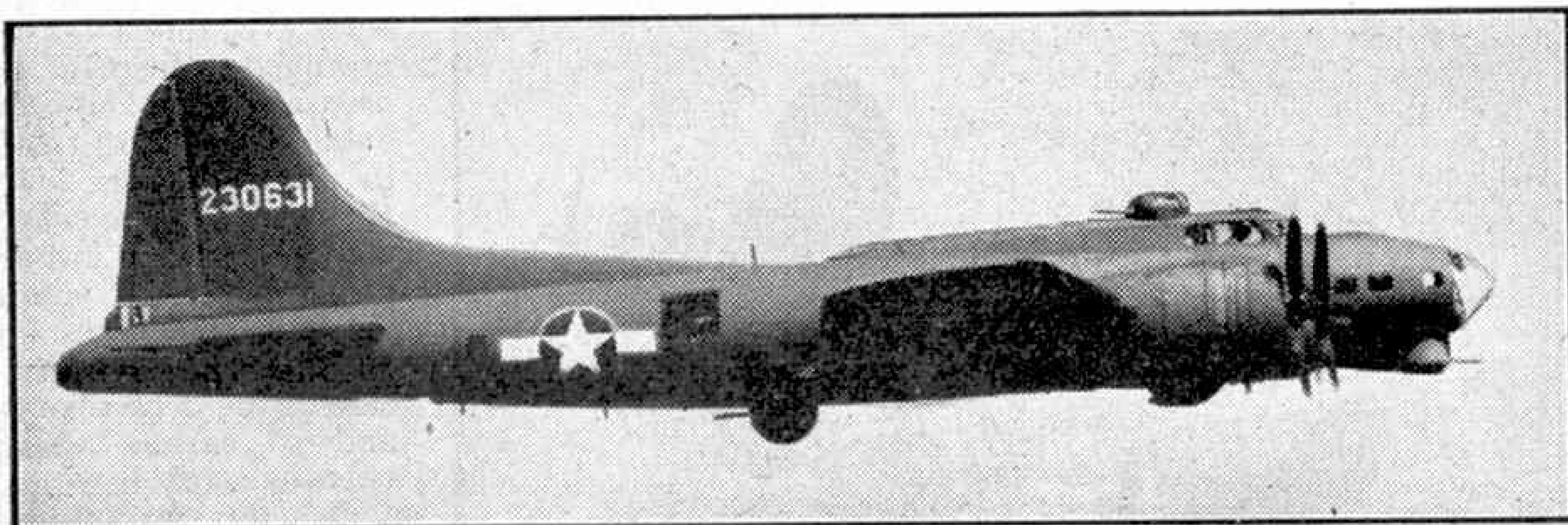
U.S. Navy is still "dry," I believe, so mixed task forces of R.N. and U.S.N. are popular on both sides.

The aircraft of the U.S.N. are good. At the start of the war—after Pearl Harbour that was—the U.S.N. was better equipped than was the U.S.A.A.C. Its torpedo-droppers and reconnaissance craft, T.B.R. (Torpedo-Bomber-Reconnaissance) types were better than anything which our Fleet Air Arm had at that time. Their flying-boats were not then up to the standard of the "Sunderlands" of our Coastal Command, but they have improved a lot.

The U.S.N.A.S. fighters were good, and the moral of the pilots and aircrews was magnificent. Over and over again squadrons have gone out from carriers to attack Japanese islands or fleets on the wide Pacific Ocean, knowing that any individual had not one chance in ten of getting back to his ship, and that his best hope of



A fine flying view of a Lockheed P-38 "Lightning." Photograph by courtesy of the Lockheed Aircraft Corporation, U.S.A.



Boeing B-17G "Flying Fortress" heavy bomber, the version with the new "chin turret." Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

living was to be picked up and made prisoner by the Japs, an unpleasing alternative to death.

The U.S. Marine Air Corps has been used in the past to give air support to U.S. Marines operating on land, as in Nicaragua some years before this war. Thus it is a co-operation weapon rather than one for independent operations. In some odd way the tradition of our Royal Marines has carried over to the U.S. Marines, who consider themselves, and rightly, very much a *corps d'élite*.

The Coast Guard Air Service is to guard the coast, obviously, and although I know that it must have done a great deal of anti-submarine patrol work, it has been neglected in official statements.

Those facts will, I hope, make clear the way in which the U.S. Air Forces are arranged and the jobs they have to do. So now let us go back to the U.S.A.A.F. and see what they have done.

The U.S.A.A.F. at Work

I knew the U.S. Army Air Service, as it was then called, very well during the war of 1917-18 and after. Its great leader, then Brigadier General, William Mitchell, always known as "Bill," became one of my best friends. I did my utmost in "*The Aeroplane*," which I then ran, to help him in his agitation for a bigger better, and independent U.S. Air Force, like our own R.A.F. In Washington in 1924 Bill Mitchell took me round and showed me all his schemes for an Air Force worthy of the size and responsibilities of the U.S.A. Also he showed me his plans for air action against Japan—he knew that war was coming, as did many more of us. And he showed me how aircraft must, in time, control the seas and be the masters of all seagoing craft, as we learned in Malaya and Siam. But the U.S. politicians and senior officers of those days were, if possible, dumber (in the U.S. sense) than our own.

Bill Mitchell proved, by doing it to a couple of German warships (a battleship and a cruiser) that bombers could sink battleships. He agitated and agitated till at last he was courtmartialled and kicked out of the Army. He died in 1935—not broken-hearted, for he was still fighting for U.S. Air Power. A few days after Pearl Harbour had proved that he was right, he was posthumously re-instated in the Army and promoted to full General, which would have been his rank if he had lived and kept on in the service. It was a graceful gesture to a dead man—but, knowing Bill Mitchell, I often think how heartily his ghost must have laughed when it happened.

Although several aircraft firms in the U.S.A. had tried to sell machines to us from 1914 onwards, the only firm to build successful craft was the Curtiss Company—whose name is still famous—they sold us heaps of flying-boats and trainers. And although the States came into the war early in 1917, not one aeroplane of U.S. design ever crossed the fighting line in France. The U.S.A. Air Service had some hundreds of de Havilland types (D.H.9s), built in

the States, and used French fighters—Bill Mitchell commanded and himself led into the air, the biggest "task force," as we might now call it, used in the war 1914-18. It was made up of U.S.A., British and French squadrons of all known types. And it did much to help to win the great battle of the Argonne.

When this war broke out in 1939 the U.S. Army Air Corps was even less ready than was the R.A.F. As in 1914, U.S. aircraft makers tried to sell war-machines to us, but they had nothing which was war-worthy, except the Lockheed twin-engined passenger machine, which we fitted with a gun in the nose and a turret aft, and called the "Hudson." We also bought "Harvard" trainers, an expensive aircraft for such work, but useful for midway training between "Moths" or "Magisters" and "Hurricanes" and later, "Spitfires."

But the U.S. business man is always keen to learn, so the heads of the U.S. aircraft industry and their technical men came over here and saw all our newest types in the air, and the still newer types which were coming along, in the shops. There was no Lease-Lend in those days. Everything was on a Cash-and-Carry basis. We paid on delivery and fetched the goods in our own ships. No U.S. ship was allowed to bring us war material. That would have been un-neutral. So we liquidated every stock and share and business property belonging to every British subject in the States and sold them for U.S. dollars, to pay for our war material.

And the U.S. aircraft manufacturers took all the money which we paid them, and probably added a good bit of their own, and with it built bigger and bigger factories, in which to build better and better aircraft. So we may fairly claim that the present gigantic U.S. aircraft industry was built up with British money during the Cash and Carry period. And I admire the U.S. manufacturers for the way they set about and achieved their enormous expansion.

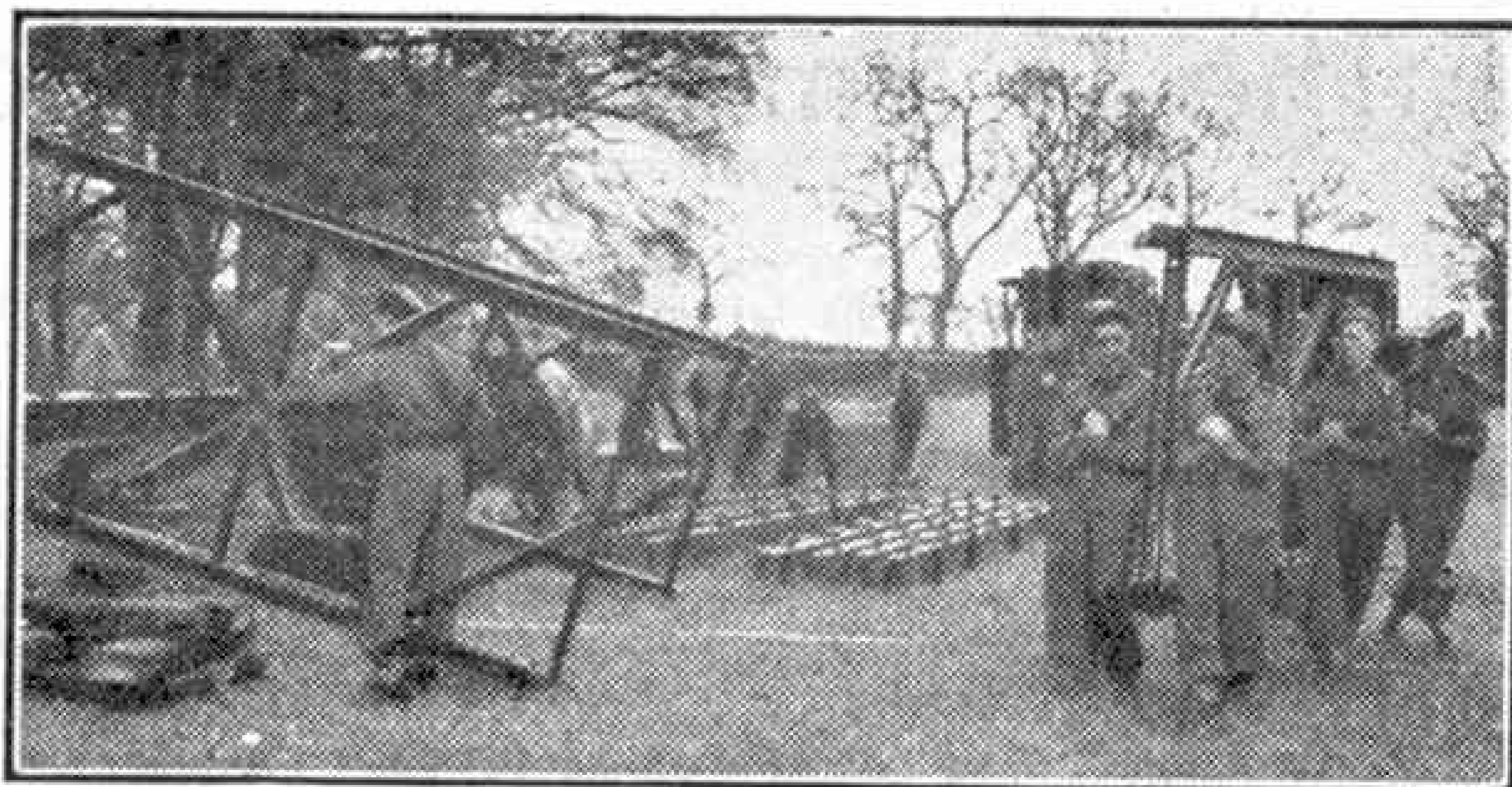
Mind you, that went on from September 1939 until Lease-Lend started early in 1941, so a lot of expansion of factories and of the U.S. flying services had been done by the date of Pearl Harbour in December 1941. For the U.S. Government did expand its own fighting services. Those in power knew that they would have to fight Germany as in 1917, and were fairly sure that they would have to fight Japan too. Therefore U.S. Government money as well as British cash, and the wealth of U.S. armament magnates, all went into expansion.

Consequently, from the start, the U.S. Army Air Corps was quite well equipped. And, better still, they were willing to learn by our experience. U.S. business people, running true to form, pushed out wonderful propaganda about the performances of their new products—built according to their own ideas and not by bitter experience. But the air crews and senior officers of the U.S.A.A.F. had no illusions.

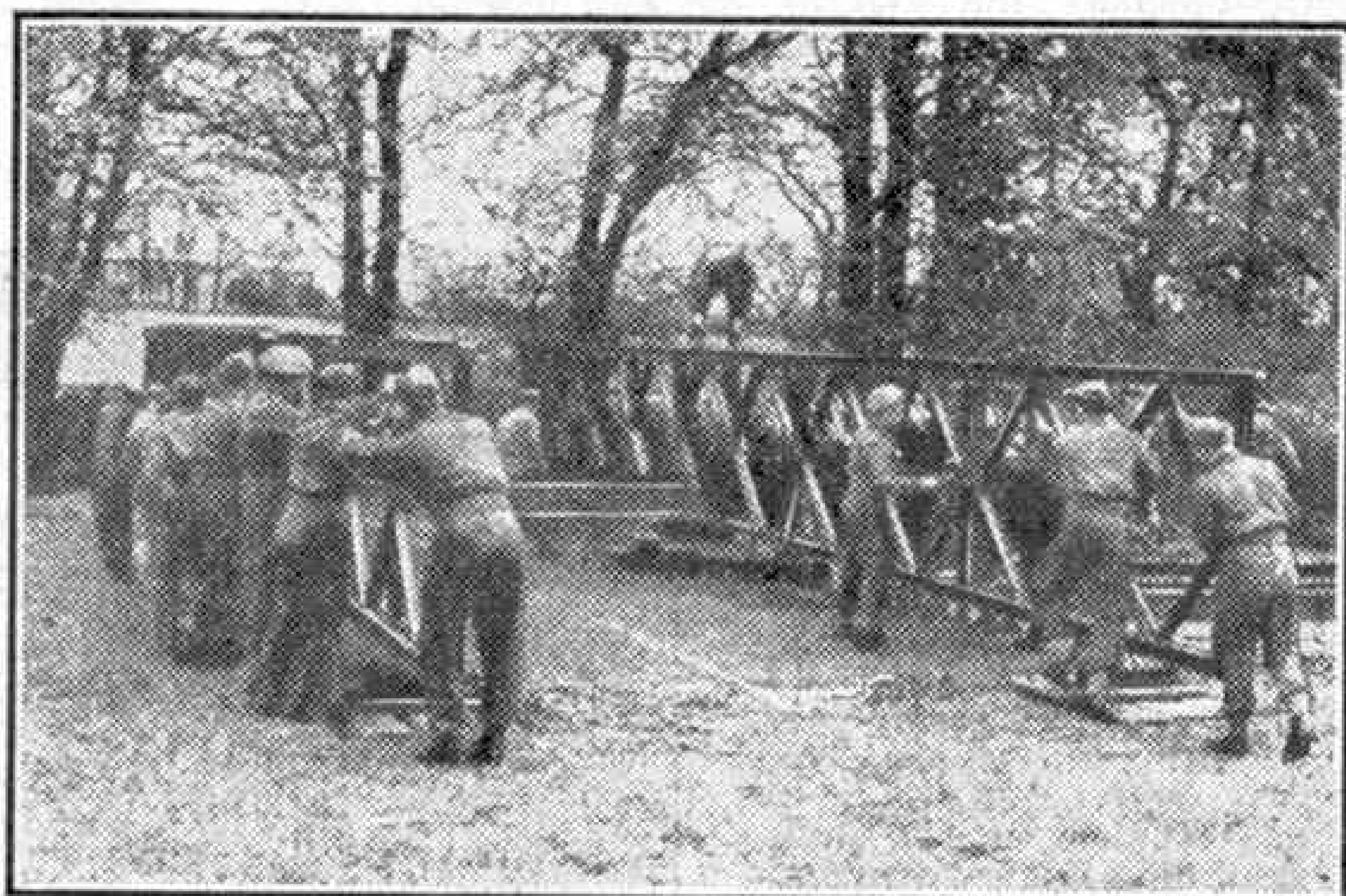
Types which were good enough to beat the Japanese—who have never been (Continued on page 394)

Building The Bailey Bridge

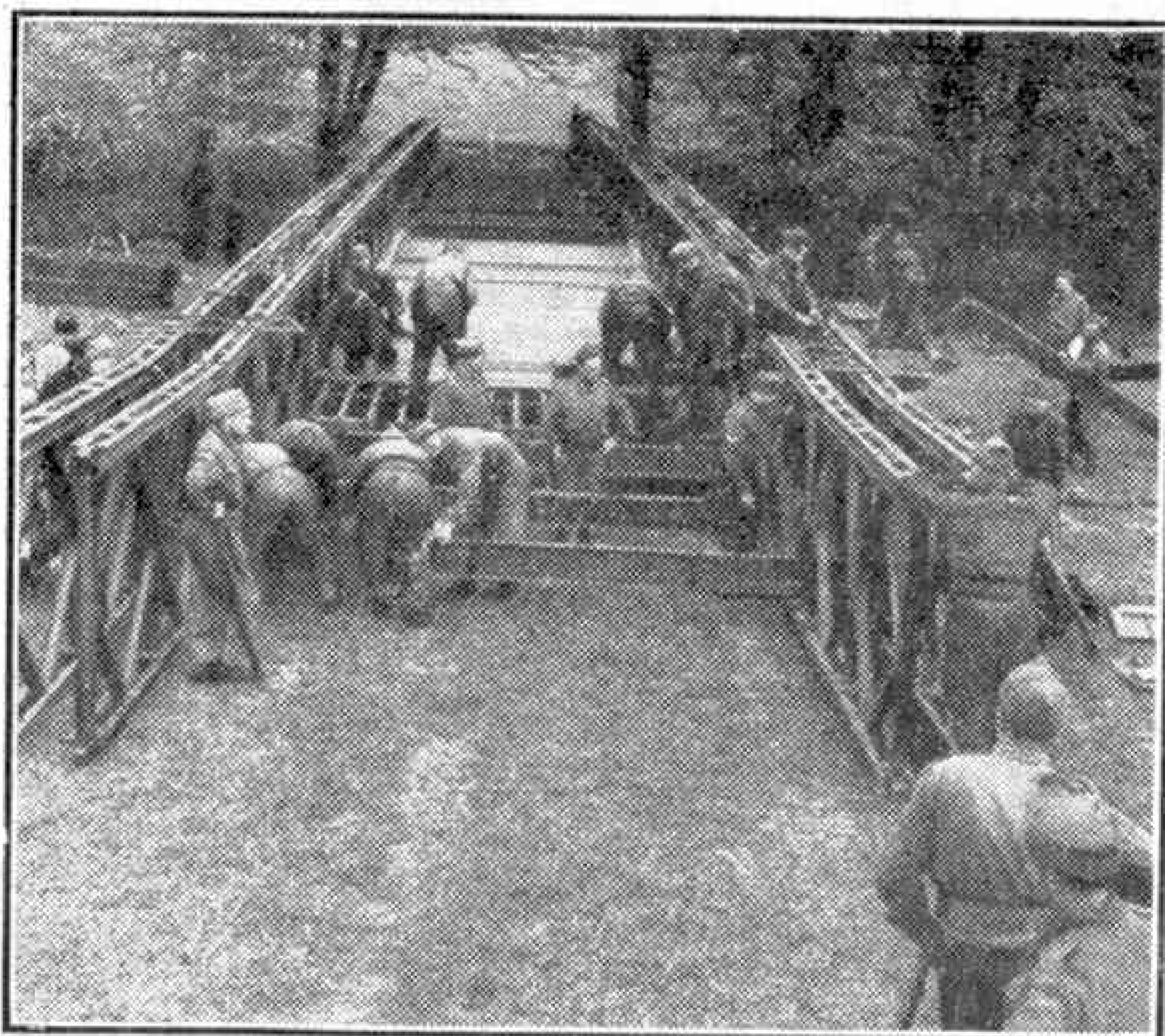
Two 15 ft. girders being carried into position on the site. Panels are later erected on both sides of the 11 ft. carriage way.



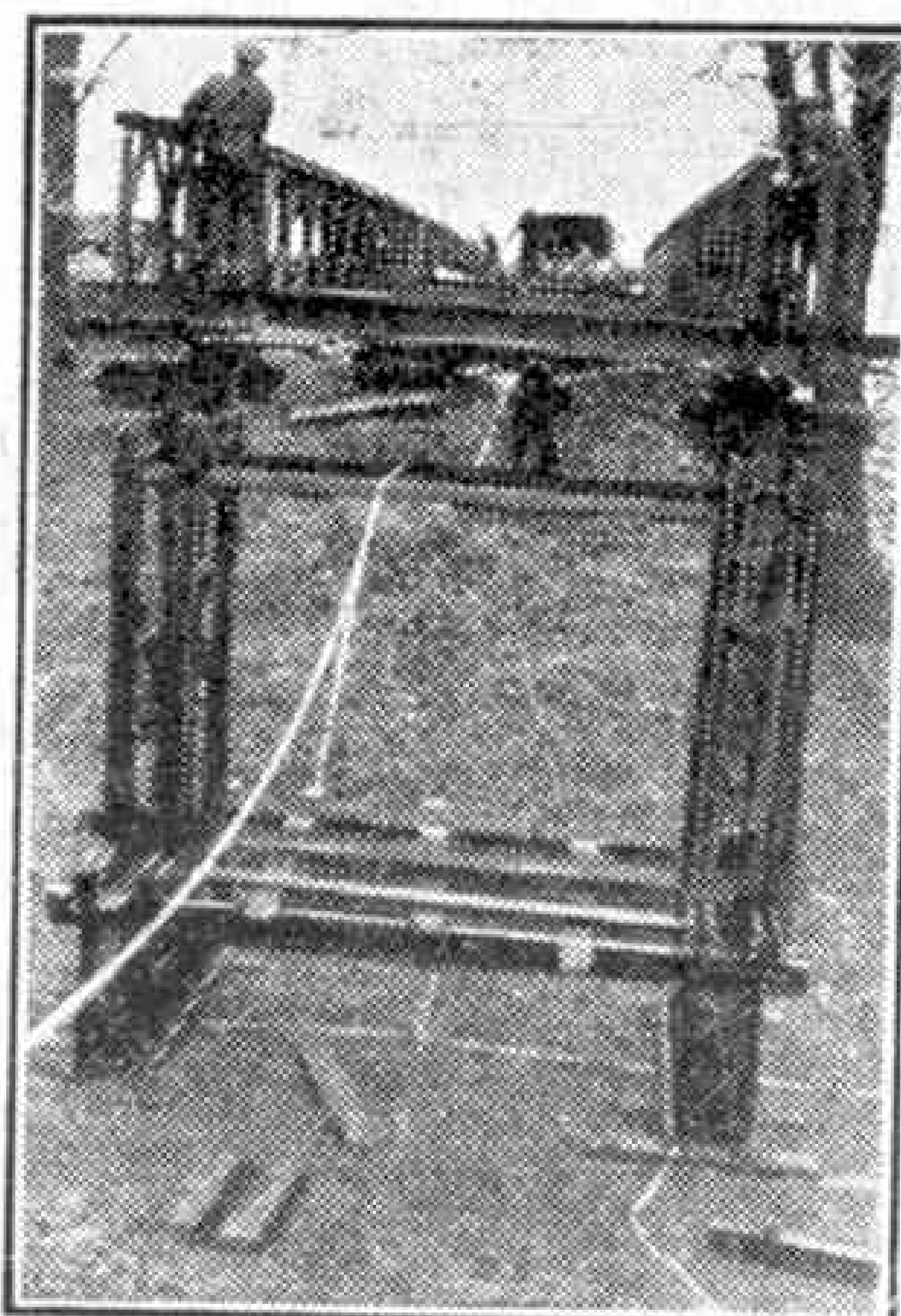
Joints between the sections are secured by driving in 2 in. pins.



As the bridge is built it is pushed forward on its rollers, and the near half of the bridge is then completed, as shown below on the left.



From the illustration above it will be seen that the surface of the bridge is laid. The purpose of this is to help in balancing until the bridge touches down on the opposite bank.



The bridge almost down on its supporting tower. The complete bridge is seen on page 361.

The 11 a.m. Glasgow to Edinburgh

By Edward H. Livesay

ONE morning before Hitler's intuition upset the world's applecart found me in the Glasgow office of the L.N.E.R. Locomotive Superintendent, making plans for a series of footplate trips through the length and breadth of Scotland. The Edinburgh services were to be tackled next day, with the 11 a.m. train ex-Queen Street first on the programme.

"Can you tell me who the driver will be? It might be someone I have ridden with before," I enquired.

"Dan Maguire," came back word from the outer office.

"Maguire! That's lucky—I rode with him on *'The Flying Scotsman'* a little while ago. Couldn't be better; a 'top link' man, the best of company, knowing locomotive driving from A to Z. What about the fireman? Bill Kinnear was with Maguire on the *'Scotsman'*. Is he still with him?"

No; Kinnear was at the moment on the Dundee runs; it would be Beatty—"Admiral" to his mates. A pity in a way; I knew Kinnear well, and his good wife and son Billy, who had also travelled with us from London in the *"Scotsman,"* in the train. Kinnear too was good company, possessed of a sense of humour that had full scope when he had tried to teach me the art of firing *"Commonwealth of Australia"* on that well-remembered run. Even the terrible Castlecary smash in 1937 had done nothing to shake his nerve and good humour, as it well might have done. You may re-call this accident in the fading light of a snowy afternoon, when the *"Pacific"* *"Grand Parade"* coming from Edinburgh ran into a standing train in a cutting, left the metals and half-buried itself in the side, one coach overriding the tender and coming to rest on the cab. Bill was the fireman of *"Grand Parade."*

"What engine will be on the job?" I next asked.

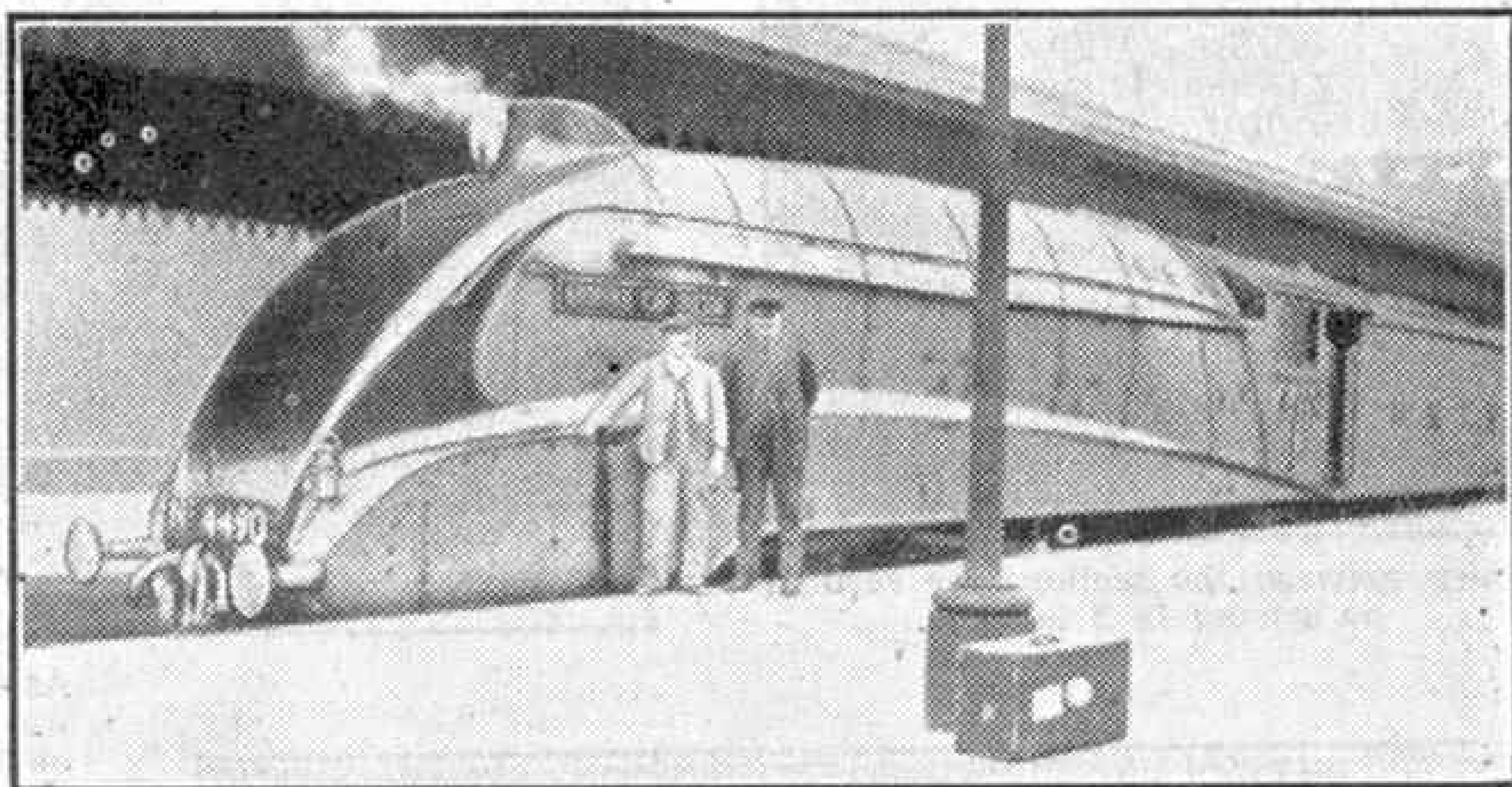
"No. 4490 *'Empire of India'*, an 'A4,'" was the reply.

Good again; one of the "Silver Link" class of streamliners, the latest type. A few of her chief dimensions, just to remind you: drivers, 6 ft. 8 in., cylinders, three in number, 18½ in. by 26 in., heating surface 3,325 sq. ft., grate area 41.25 sq. ft., pressure 250 lb. per sq. in., tractive effort 35,455 lb., weight, engine without tender and in working order, 103 tons. The tender runs on eight wheels, carries 9 tons of coal and 4,000 gallons of water, and has pick-up apparatus and a corridor through it on the right side so that the crews can change over on the long 392-miles non-stop London-Edinburgh runs. The tender is vestibuled to the train, the second crew riding in a reserved compartment next the luggage space until it is time for their "shift." The total weight of engine and tender is 168 tons in working order.

One of the class, *"Mallard,"* you may remember, reached 126 m.p.h. on a special test trip, the world's record for steam locomotives to this day. At that speed the streamlining saves about 300 h.p., though it is of very little benefit below 70 m.p.h., except to create an up-current of wind tending to carry the exhaust clear of the cab windows, a really good thing, as in these days of squat chimneys, big boilers and short cut-off running, the steam merely dribbles

out of the front end and can be a fearful nuisance to the crew. Kylchap and Lemaitre blast arrangements used on the Southern Railway make things all the worse in this respect.

Yes, the "Silver Links" are fine locomotives; engine and crew alike would be of the best next day. I was somewhat surprised to find such a powerful engine on a light and not particularly fast train like the 11 a.m. Probably it had come into Glasgow on a heavier one and was wanted in Edinburgh for more important duties. I gathered there were no very striking trains on the Glasgow-Edinburgh route; the distance, 47 miles, is too short to make time-cutting worth while. Only a few minutes could be saved anyway, and Scotsmen are too sensible to bother about such trivialities! The track lay-out is very easy too, with little curvature and almost non-existent gradients after the first mile, but that first mile, as Kipling would have said, is another story. It's a teaser!—1-in-45 up through the Cowlairs tunnel



L.N.E.R. No. 4490 *"Empire of India"* at the start of the run described in this article, with Dan Maguire and "Admiral" Beatty, the driver and fireman.

with probably greasy rails, and beginning practically at the end of the departure platform. It's a bad start. In the old days it was too much for the engines altogether; the whole outfit, locomotive and train, had to be hauled up on a rope worked by a stationary engine at Cowlairs. But this arrangement has long since disappeared, and now the train engine at the front just digs its toes in, with the engine that has brought the train into the station behind giving a bunt up the incline and dropping off at the top.

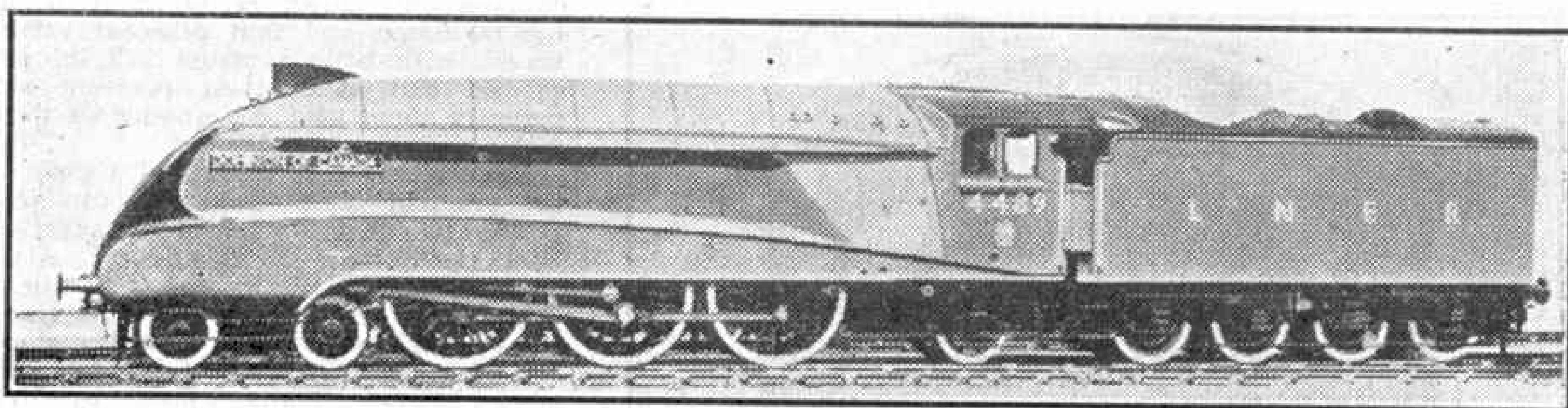
Scene: the departure platform at Queen Street on a sunny Spring morning, and *"Empire of India"* champing her bit at the head of a 250-ton train all ready for the fray, with Dan Maguire and "Admiral" Beatty in the cab extending hearty greetings. There's no stiffness about Dan—he's a friendly bloke! Things in the close quarters of a locomotive cab are far more pleasant when the "atmosphere" is right—though I admit it always has been in my experience.

"Well, Maguire, I hope you are going to put up a good show. There's not much behind, anyway—this engine ought to eat it!"

"Aye, that's a' richt," Dan laughed, "but we canna get too much aheid o' time, and it's no' a verra fast train, ye ken."

"Well, do your best, anyway; what's the use of having a Flaman Recorder if you aren't going to do anything worth recording?"

"Aye, but there's no paper in it!" This meant



L.N.E.R. "Pacific" No. 4489 "Dominion of Canada," one of the "A4" class.

that the moving paper roll, on which a pencil traces a line showing graphically the exact speed at which the engine travels, was not in position. It is a locomotive lie-detector, in fact, not always too popular with the crews.

"That's all the better," I pointed out. "You can hit the high spots, and nobody will know anything about it."

"Aye, but A'doot the Guard will!"

"Oh, blow the Guard—perhaps he won't notice." Dan and the Admiral grinned.

"Well, we'll see," and with that I had to rest content. Of course, I never expected Dan to do anything spectacular or illegal merely because I was in the cab; he was far too experienced a man to indulge in unwarranted speeding "just for fun." Driving an express engine is a very responsible job, governed by rules and regulations that are imposed for reasons of safety and for the good of all, and which it is expected will be kept. I looked for nothing over 75 m.p.h. or so from "*Empire of India*" that sunny day, and the schedule didn't seem to make even that likely. If I remembered rightly, it was 62 min. for the 47 miles, with a stop at Falkirk thrown in. Anyway, it was going to be a pleasant little jaunt on a fine engine, with a good crew, a light train and a lovely Spring day, everything "a blowing and a growing."

Another thing—the cab was very comfortable, what with a padded bucket seat for my weary bones, good "look-ahead," wind-deflecting glass strip in front of the side window, draught-excluding rubber connection between roof and tender, cut-off scale where one can see it clearly, placed vertically on the backplate in front of the driver—L.N.E.R. engines are the only ones, by the way, with this sensible arrangement that I know of on either side of the Atlantic—Flaman speed-indicator, or Hasler, I forget which, under the fireman's seat, and so on. The late Sir Nigel Gresley set a high value on cab comfort and convenience, and rightly, as it may be synonymous with safety. His cabs are the best I have come across in Britain, and are fully equal to the run of those across the Pond, due allowance being made for the difference in the respective loading-gauges, roughly 9 ft. by 13 ft. as against 10 ft. 6 in. by 15 ft. 6 in. The hanging "both sides" regulator handles are good too; the fore-and-aft action is natural, more so than the "across the engine" movement called for by the usual type. The horizontal reverse handle, beside the driver, is convenient and easy to work. One notices these things in a Gresley cab, and they make a good impression, so I settled down in Beatty's seat with a feeling I was in a locomotive heaven and that all was right with the world.

Eleven a.m., a wave of the Guard's green flag, and "*Empire of India*" went forward into her collar. With cylinder-cocks viciously hissing and sand blowing under the wheels she was away into the tunnel with a rush, accelerating up through the sooty cavern in great style, as could be felt but not seen. We were plunged into Stygian darkness smelling like a washing day. The cab became at once a hot, stuffy, blacked-out box, full of smoke, steam and thunderous noise, amid which the Admiral's form could be seen

dimly, moving energetically between fire-door and tender in a hazy golden glow from the furiously agitated flames raging in the fire-box, to the rhythmic music of his clanging shovel. Beatty was not going to let the grass grow under his feet, evidently, any more than had his namesake at Jutland.

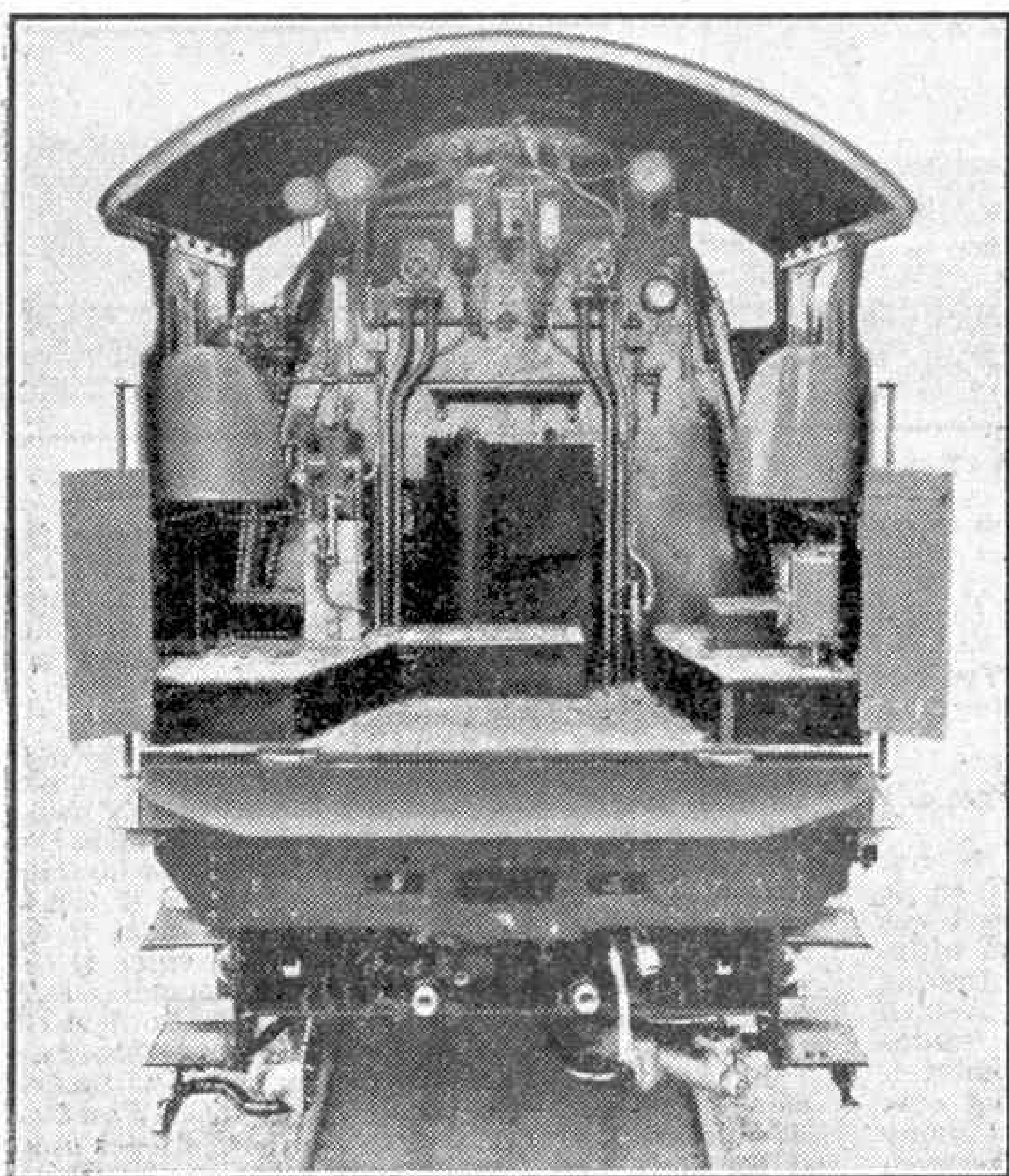
Maguire I couldn't see at all—he was lost in the murk. But he was there—the engine's behaviour proved it. She seemed to have got the lines under her tail, judging from the way the speed was rising, and we burst out into the open like a Jack-in-the-box. As we neared the top of the incline and Cowlairs station, and my goggles cleared of steam, I looked back, to see the banking engine drop off as if exhausted, leaving us to pursue the even tenor of our way alone. We ran away as if it were standing still, picking up speed and rushing through Cowlairs in about 4 min. from the start. Quite good this, from a standstill, and up through a slippery 1-in-45 tunnel, though of course with banking assistance. Reaching level going, the cut-off, which had been 65 per cent. at the start, and I don't know what in the tunnel as I couldn't see the scale through the fog, became 28 per cent. with the regulator left wide open. This is the rule with "A4s"; they are designed for "full regulator, short cut-off" operation.

Bishopbriggs, 3 miles from the start, was passed at 65, and Lenzie at 70; 9½ min. for the 6½ miles from Queen Street, and the 5 miles from Cowlairs had taken only a little over 5 min. Things were brightening up, and I began to get hopeful. A few days before I had made the same trip on an older "A1," "*Knight of the Thistle*," and she had taken 13 min. to Lenzie. But she hadn't had Maguire and an Admiral in the cab, or she might have done better.

A speed restriction through Waterside Junction brought us down to 10 m.p.h., but before Croy, the next station, it was up to 70, rising. Castlecary loomed up ahead, and as we rushed through the cutting, the scene of the terrible 1937 smash, I tried to picture what had happened there in the dusk of that snowy December afternoon, but it was hard to do it, the contrast between the conditions existing then and those on this bright Spring morning being too great. Shortly after, approaching Bonnybridge, the brakes went on for a pit subsidence bringing our happy flight down from 75 to 25. There are plenty of coal mines about here, as the piles of slag and pit-gear testify.

Picking up again rapidly, on 25 per cent. cut-off, this was shortened to the usual 17 per cent. running position, remaining there until steam was shut off for the Falkirk stop, made at 11.27 or 3 min. ahead of time. We had covered 21½ miles from a standing start in 27 min., with the Cowlairs incline and two slowings to 10 and 25 respectively. Yes, Maguire evidently was trying to put up a good show for my benefit, and was succeeding.

The hard-hearted Guard kept us standing five minutes until the proper starting time. It is against the rules to get away too soon, somebody might get left behind and sue the company: this has actually occurred, the plaintiff winning his case. At 11.32 No. 4490 was given the gun, getting away like a jack-rabbit, and sailing through Polmont, 3 miles along, at over 70. Thank goodness I could get my



The cab of an L.N.E.R. "A4," with the recorder under the fireman's seat, on the right.

figures from the Flaman indicator, and my watch could rest in peace in my pocket. I hate keeping my eye trained on watch and mile-posts when there are so many other things of far greater interest and importance to be noted in the cab.

We were really moving now, helped by the slightly falling gradient that begins just outside the eastern end of the little Falkirk tunnel, through which "*Empire of India*" had banged angrily as if anxious to get out into the open and breathe easily. The speed was rising fast; we roared through Manuel at 80, taking the slight rise to Philpstoun with scarcely any drop in pace, and the needle was back at 80 a few yards beyond the top. But then it receded rapidly and I felt the cling of the brakes—we were nearing the great stone viaduct at Ratho, with its 30 m.p.h. restriction. Fine open country here, the nicest I had noticed since leaving Glasgow, with Edinburgh in sight, only eight miles away, alas.

If Maguire was going to let No. 4490 show her heels he would have to be quick about it—the sands were running out. In fact, I had really given up hope of seeing anything over the 80 already reached, resigning myself to contentment with that fairly mediocre figure, when by Jove, we are picking up speed here with a vengeance! What's happening? Had I shown superficial judgment? Were there unplumbed depths in Dan and 4490? Should I have more faith in them? It certainly began to look like it.

We were well clear of Ratho and its restriction by now, and "*Empire of India*" was accelerating like a terrier with a tin can tied to his tail, faster, I think, than I have ever felt an engine accelerate before. A hurried glance at the gradient-book—yes, we were going down hill right enough, but only at 1 in 960, surely not enough to have any such sensational effect. This must be investigated! Regulator? Full open, as usual. Cut-off? Out of the seat, nipping across the cab, dodging the Admiral en route, for a peek at the scale. Ah, 35–40 per cent., that's the

explanation! Down grade, light train, full regulator, and that generous valve-travel, with boiler-pressure 247 lb. per sq. in. and steam-chest pressure apparently about 240! No wonder we were picking up like a rocket-car.

Back to my seat again and a grab at the gradient book—how long can this acceleration go on—where are we exactly? How much room have we got? Alas, not very much. We were nearing Gogar already, with only five miles to Haymarket and six to the Waverley stop. No, we can't possibly keep this up much longer. Really roused by this time, and with nose in gradient book, I was startled by a hail from across the cab. Maguire was making pantomimic signals the meaning of which I finally grasped; he wanted me to bend down and look at the Flaman recorder under my seat, which was out of my sight, though easy enough for him to see from across the cab. Assuming the graceful arc necessary for this consultation—you practically stand on your head—to my delight I saw the needle was quivering at the 90 m.p.h. mark. Lovely!

Certainly I had never expected that between Glasgow and Edinburgh with this very moderately timed train, and with the stop at Waverley only about four miles off! This was getting exciting; I hoped the brakes were O.K.! It was well over anything I had done previously in Scotland, and I had only once slightly exceeded it in England, on "*King William III*" with the "*Cornish Riviera Limited*" down the Patney-Lavington bank. Good for Maguire, "*Empire of India*" and Scotland! She was riding beautifully, just as a thoroughbred engine should, without the slightest knock or pound perceptible anywhere, and as we roared through Gogar, and on towards Saughton, once again I felt that warm glow begin to spread through me, that tingling sensation I always feel when I am really enjoying something keenly, something out-of-the-ordinary that I have wanted badly. I felt it the first time I drove a motor car, and that was 45 years ago, when I was a kid, only two years after the passing of the "Red Flag Act!"; again when "*Commonwealth of Australia*" went spinning down the long grade from Potters Bar at 90 m.p.h. with "*The Flying Scotsman*," and for the first time in my life I was doing what I had always longed to do—riding a top-notch British express locomotive at speed as the beautiful engine extended herself on perfect British track. I had done 80 on engines in America, but that had been quite a different sensation—harsh, strenuous pounding with the one type, an easy, effortless, swinging gallop with the other—almost the action of a truck compared with a Rolls-Royce! And here was "*Empire of India*" doing the same thing, at the same speed. Perfect!

Maguire evidently thought this little sprint would please me, and so it did. I shouted across the cab: "That's fine, but step on it—let her have it!" Maguire laughed, and shook his head, as I expected; 90 was quite fast enough, with Haymarket not far away; we were closing it at the rate of knots. I saw him push the regulator forward, and felt the brakes begin to hold—our little gallop was over. We were away ahead of time too, though at the moment I wasn't aware of it, and slowing through Haymarket and the tunnels "*Empire of India*" came to a stand in Waverley at 11.57, 5 min. early. The 47 miles from Glasgow had been covered in 57 minutes, with a five minute stop at Falkirk plus three checks to 10, 25 and 35 as well. The chief feature of the run, apart from the 90 m.p.h. maximum, had been the Falkirk-Edinburgh section, 25.5 miles start-to-stop in 25 min., 61 m.p.h.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, these should be ordered through a bookseller. We can supply copies to readers who are unable to place orders in this manner. Order from Book Department, Meccano Ltd., Binns Road, Liverpool 13, adding 6d. for postage.

"MODERN LOCOMOTIVES AND ELECTRIC TRACTION OF THE SOUTHERN RAILWAY"

(The Locomotive Publishing Co. Ltd., 1/6 net)

The Southern Railway is unique in this country in its extensive development of electric traction along with the improvement of its steam locomotive services. It is largely a passenger carrying line, with main line services and an enormous residential traffic in and around London. A booklet such as this, describing the modern locomotives and the electric traction system employed on the line, is therefore of absorbing interest. It begins with a review of the position of the railway, with its 2,150 route miles of line, and passenger journeys approaching 400,000,000 in number every year, with 15,000,000 tons of goods traffic. To deal with this there are 1,816 steam locomotives, 3,189 electrically operated coaches, 5,319 other passenger coaches and 33,709 freight vehicles.

The present position has been reached by a process of standardisation, following on grouping, which brought into the system a great variety of locomotives. New classes have been introduced, and each of these is dealt with in turn, the reasons for its introduction being given as well as a description of its main features. Then we turn to electric trains, which may not have the glamour of steam locomotives, but compel interest by their rapid acceleration and marvellous efficiency. The development of the present extensive system is traced, showing us how first one section and then another was converted to electric traction, and then we have an account of the new electric locomotives, one of which completed its trials last year.

Other interesting facts and details of the S.R. are given in the booklet, which ends with complete lists of named locomotives. The illustrations are a special feature, every important class of locomotive being illustrated as well as steam and electric trains.

"THE BOOK OF WESTLAND AIRCRAFT"

(The Harborough Publishing Co. Ltd., 12/6 net)

In this splendid book the publishers of the well-known volumes "*Aircraft of the Fighting Powers*" have broken new ground by devoting the work entirely to the products of one firm—Westland Aircraft Limited, producers of the famous "Lysander" Army Co-operation machine and the well-known "Whirlwind" fighter.

A lengthy introduction tells how the Westland Aircraft firm came into being early in the 1914-18 war as the direct result of an offer by Petters Limited, the famous oil-engine builders, to make whatever the War Office or Admiralty needed most for the war effort. The Admiralty immediately asked for sea-planes, and although Petters Limited had never done anything in the aeronautical line they tackled the problem valiantly and with such efficiency that the new company they organised to carry out the work went from success to success. The fascinating story of this progress during the last war and afterwards is made more vivid by the many excellent photographs with which it is illustrated.

The second and major part of the work gives a brief history of every type of aircraft produced by the company, together with a photograph, short specification, and 3-view scale drawings.

Owing to wartime difficulties, it is impossible to guarantee prompt delivery of books ordered as described at the head of this page, but every effort will be made to ensure speedy despatch.

"WHEN THE TYPHOON BLOWS"

By E. FOREMAN LEWIS (Harrap, 7/6 net)

This is an impressive story of China's fight against the destroying Japanese, of the slow retreat westward in face of pursuing armies and of the great struggle to secure supplies from the west by the Burma Road. One picture after another of China in its great fight emerges as we follow Li Thirty-nine, who as a youth earned his living by fishing in the sea and always dreamed of fortune awaiting him in some ancient city. From his dreams he was awakened by Japanese bombers, which destroyed his village and made him a fugitive. Eventually he joined an American hospital in which he became an orderly, and when the Japanese advance engulfed more of China he was enrolled in the unyielding groups that made their way to Chungking.

The story is admirably told. The author knows China intimately, as she showed in "*China Quest*," reviewed in the March 1938 "*M.M.*," and in other stories, and she gives us authentic pictures of life in the fields, villages and cities of the country, of the irregulars who keep up the fight against the Japanese, and of all those, soldiers, doctors and others, who represent the new China. There are a coloured frontispiece and 10 other full page illustrations, besides many drawings in the text.

"OUR RAILWAY HISTORY" (Part 2)

By RIXON BUCKNALL (3/6)

In this, the second part of his story, Mr. Bucknall continues his pleasant accounts of the railway companies of Great Britain before grouping in 1923. In it he deals with the Great Eastern, the Lancashire and Yorkshire and the Great Central, and with the lines that eventually were united in the present Southern Railway. In each case he gives a brief but adequate connected account of the beginning of each line and its subsequent development. All of the lines dealt with give opportunities for good stories that illustrate the astonishingly varied characteristics of the railways concerned, and Mr. Bucknall makes the most of these, paying special attention to the locomotives and the famous engineers who built them.

Copies of the book can be obtained from Mr. Bucknall, 71, Witley Court, Woburn Place, London W.C.1, price 3/9 post free.

"ONE MORE SUMMER"

By A. DE SELINCOURT (Routledge, 7/6 net)

We have already met Ann and Elizabeth, Anthony and Robin, the last time in the author's "*One Good Tern*," reviewed in the "*M.M.*" for May 1943. Once again we have a story of their adventures afloat, this time in an estuary alongside which they were spending a holiday. They soon run into a mystery, which centres around "*The Star of Asia*," a sailing ship of the grain fleet, lying with a broken back in a gully off the estuary. There is a feud too between a friendly fisherman and an overbearing farmer, and the four have exciting adventures while solving the mystery, as well as delightful times sailing in the estuary and in the open sea at its mouth. Everything of course turns out well in the end. The book is illustrated by excellent line drawings and a chart.

Air News

Handley Page Air Liner

It is now known that the new Handley Page transport aircraft will be called the "Hermes," and that it will be large enough to carry up to 50 passengers, with sleeper accommodation for night travel. The "Hermes" will have four Bristol "Hercules" engines and, it is believed, a cruising speed of 240 m.p.h. at 10,000 ft., and a range of 2,000 miles.

American and German Rockets

Details are now available of the rockets carried by American and German fighters. Whereas most American aircraft are fitted with four standard British rails under each wing, the version now being used with great success by "Thunderbolt" squadrons consists of a cluster of three "M-8" tubes under each wing, each of which houses an "M-10" rocket.

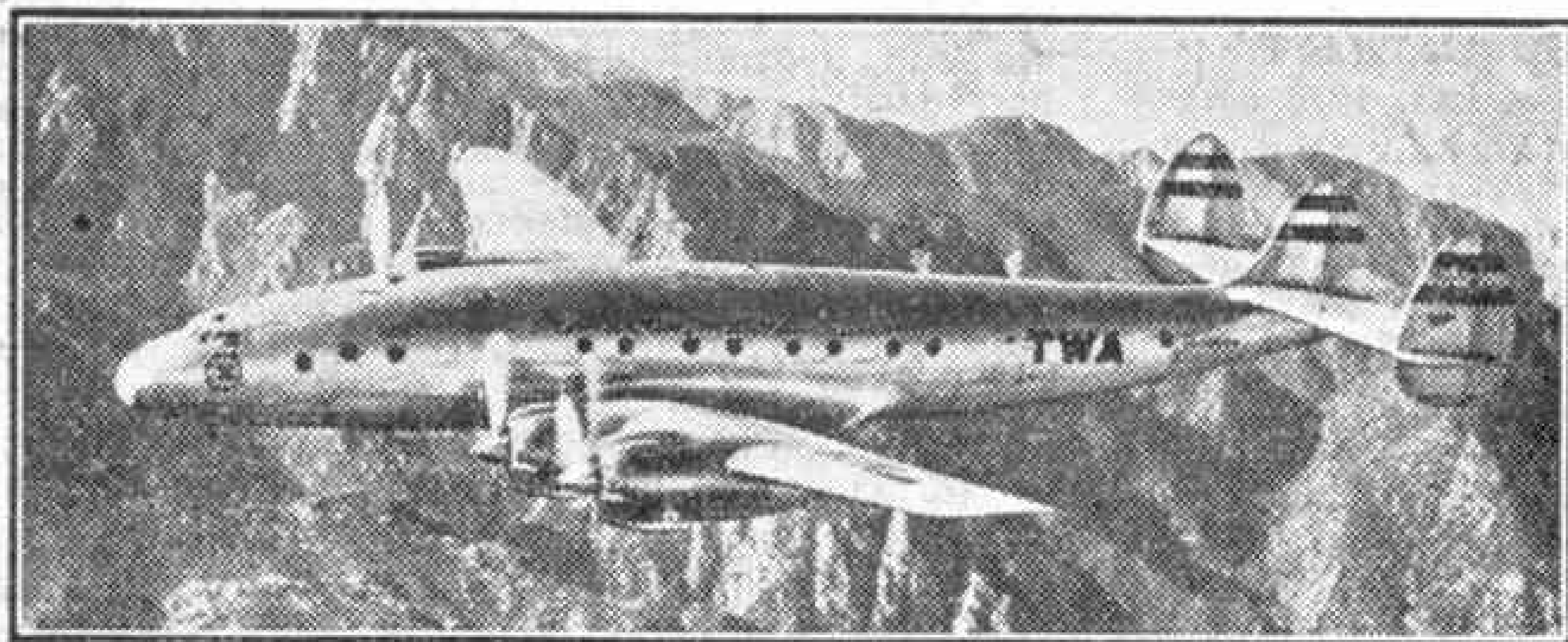
German aircraft equipped for carrying rockets include the Focke-Wulf 190 and the Messerschmitts 109, 110 and 410. The rockets are intended chiefly for use against Allied bombers.

The rocket is housed in a 3/32 in. thick steel tube and is fired electrically. The explosive charge is set off by a time fuse. These rockets are very different in form from the British rocket projectiles and have no fins; instead, stability is ensured by offsetting the propelling venturi jets. The tubes are attached to the wing spars by hooks, and the entire installation can be jettisoned by means of a detonator switch in the cockpit.

J.W.R.T.

United States-France Non-Stop Flight

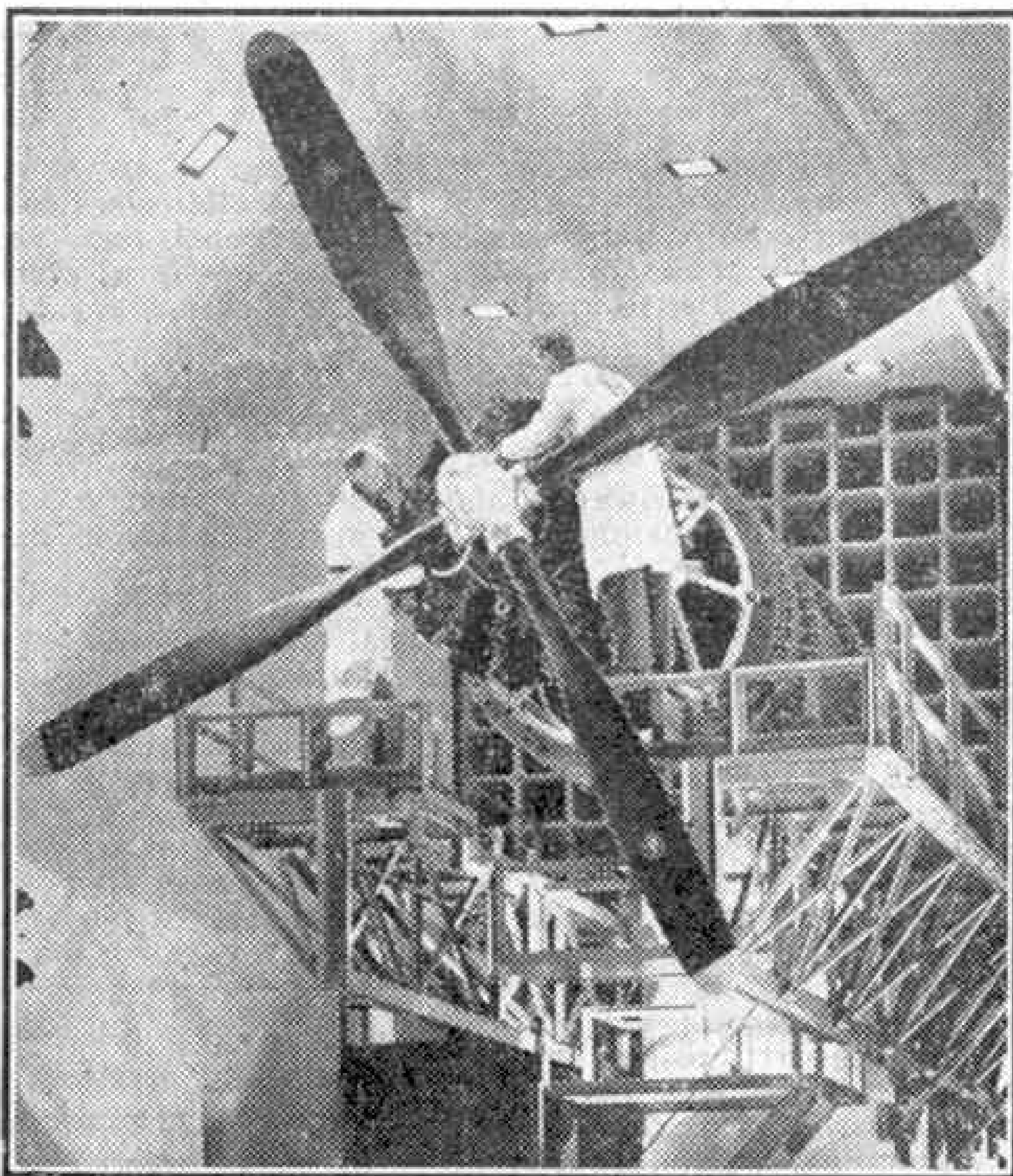
The first direct non-stop flight between the United States and France since Col. Lindbergh's historic transatlantic flight in 1927 was made on 5th-6th October last by General George C. Marshall, U.S. Chief of Staff, who flew to France to confer with General Eisenhower and his staff. The long flight from Washington to an aerodrome near Paris was made in President Roosevelt's own machine, a Douglas C-54 "Skymaster" twin-engined transport, and took about 18½ hrs. Gen. Marshall was accompanied by several high U.S. Army Officers.



A Lockheed "Constellation" transport of T.W.A. that broke all U.S. trans-continental records by cruising from Burbank, California, to Washington in 6 hr. 58 min., at an average speed of 330 m.p.h. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

New British Gun-Sight

The Gyro Sight Mk. IID fitted to the latest British fighter aircraft is the only gun-sight in the world that remains accurate at ranges of over 400 yds., at speeds of more than 400 m.p.h., and at sharp angles



This huge 16 ft. 8 in. propeller is the largest 4-bladed hollow steel propeller in quantity production in the United States. It is designed to absorb about 3,000 h.p., and is here seen being prepared for testing. Photograph by courtesy of Curtiss-Wright Corporation, U.S.A.

of attack. It has been developed by the Ministry of Aircraft Production, and in spite of its complicated internal mechanism it is very simple to operate.

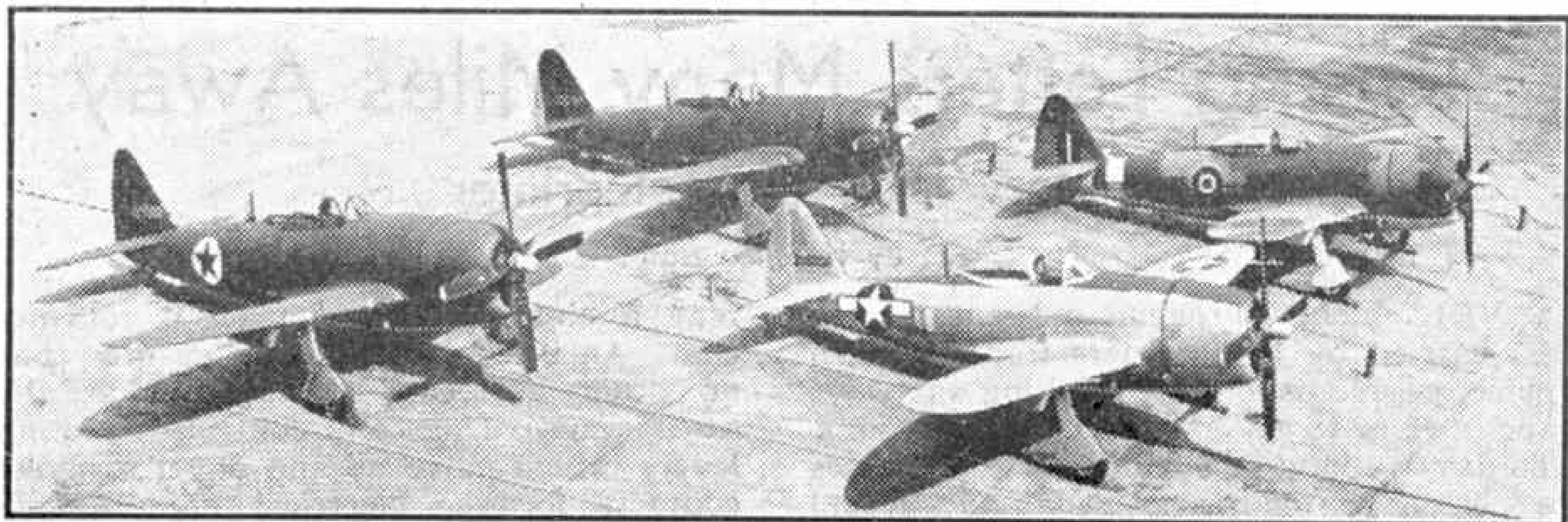
The graticule, which consists of six diamond-shaped spots arranged in a circle round a centre one, is reflected on to a glass screen 4½ in. by 2½ in. mounted above the sight. Only two adjustments are needed to use the sight. First of all a pointer at the centre of the sight must be moved round a scale on which are inscribed the names and wing-spans of the best-known enemy aircraft, to a point opposite the name or span of the machine to be attacked. The range

is then corrected by means of a twist-grip on the throttle lever. By a complex series of electrical devices inside the sight, as the range shortens the graticule grows larger so that the wing-span of the enemy aircraft fits exactly into the graticule. The sight itself takes care of all deflection worries, and all the pilot has to do is keep the enemy machine centred in the graticule and press the gun-button.

J.W.R.T.

[Helicopter Designed by 19-yr.-Old American

Stanley Hiller, Jr., a 19-yr. old Californian youth, has designed a single-seat helicopter that has two contra-rotating 2-blade rotors, one above the other. It is appropriately named the "Hillercopter" and its 90 h.p. Franklin air-cooled engine gives it a top speed of about 100 m.p.h. This helicopter was demonstrated recently to officials of the U.S. Army, Navy, and National Advisory Committee of Aeronautics.



Republic P-47 "Thunderbolts" are being supplied under lend-lease to some of the Allied nations. The markings show that the three companions of the U.S.A.A.F. "Thunderbolt" in the right foreground are (reading from the left) destined for Russia, Brazil and Britain. Photograph by courtesy of Republic Aviation Corporation, U.S.A.

Rocket-Aided Take-off for "Swordfishes"

Carrier-borne "Swordfish" aircraft of the Royal Navy are now being helped into the air by means of rockets mounted on the underside of the lower wings. Up to four rockets are grouped under each of these wings, and they are mounted in rocket-tubes held in a carrier. The rockets contain a cordite charge and are fired simultaneously by the pilot at a pre-determined moment after the machine has begun its take-off run, their effect being to speed up that run and thus shorten the take-off distance. They assist in this way for about 4 sec., the time taken for all the cordite to be expended, but brief as it is this help is very valuable, especially when the aircraft take off from escort carriers, the decks of which are shorter than those of the big aircraft carriers.

Consolidated "Liberator Express"

A feature of the recent ceremonies commemorating the completion of the 5,000th "Liberator" bomber built by Consolidated's San Diego Division, U.S.A., was the first public appearance of the Consolidated 39 "Liberator Express." This new air liner is very similar to the "Liberator," except that it has a much longer fuselage and a single high fin. It seats 48 passengers on daylight runs, and when operating as a sleeper plane can accommodate 24 persons in comfort. It has a gross weight of 56,000 lb., identical with that of its bomber prototype.

The new air liner is designed to carry 1,200 lb. of mail as well as passengers for 2,500 miles at a

cruising speed of 240 m.p.h. If operated as a freight carrier a payload of 12,000 lb. can be carried.

J.W.R.T.

Two Messerschmitt Fighters

Some facts about the two Messerschmitt single-seat reaction-propelled fighters are now available. The Me 163 has one rocket-unit and, according to American pilots who have engaged it, is of the tail-less type, with low-aspect ratio swept-back wings and a single fin and rudder. The Me 262 is of more orthodox design, and has two "jet-units" of the Junkers Jumo 004 type, mounted one under each wing in a similar manner to those of the U.S. Bell "Airacomet" fighter. This American jet-propelled machine, incidentally, is now being used by the U.S.A.A.F. for operational training, and consequently should be in action soon.

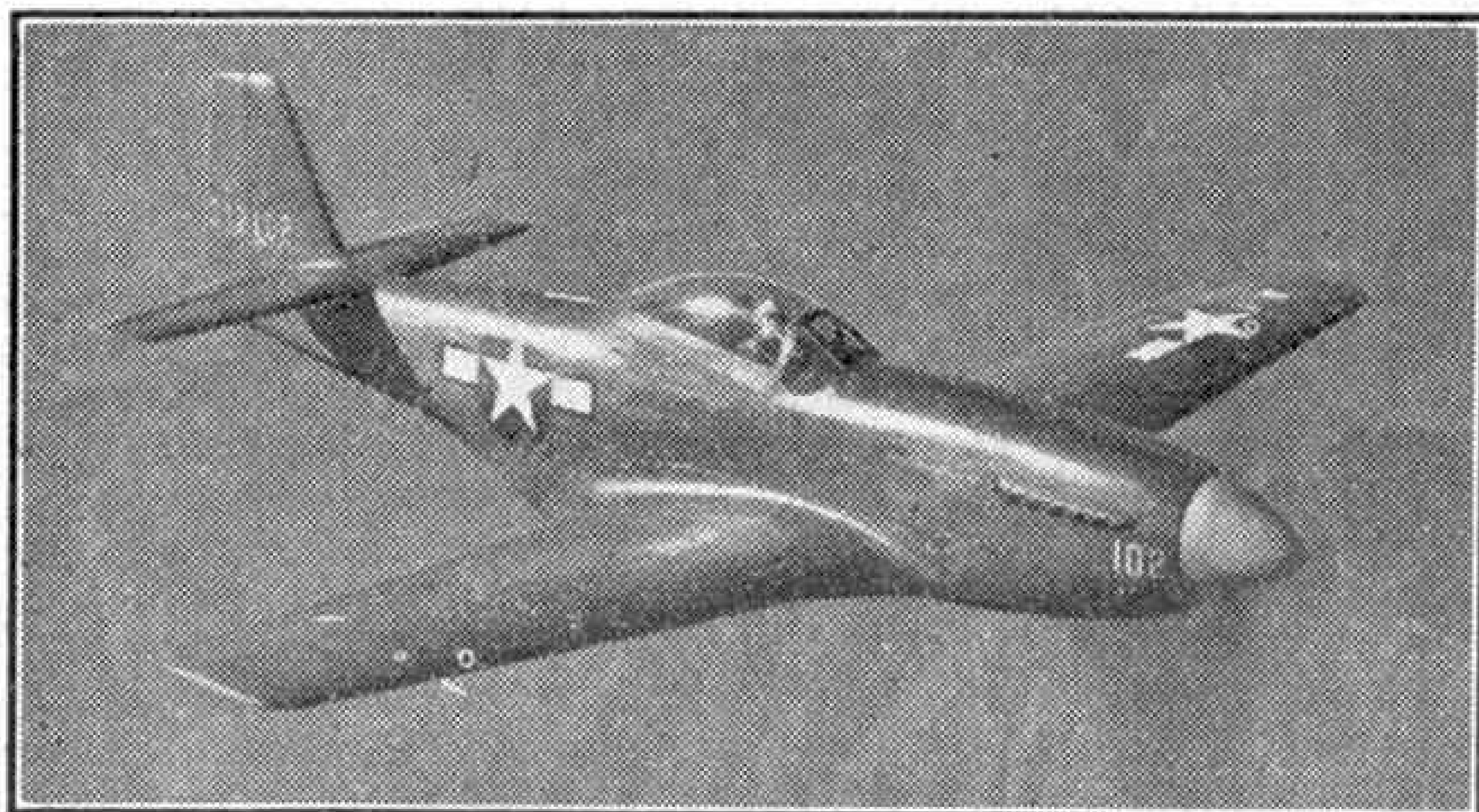
J.W.R.T.

Curtiss-Wright's Fine War Record

Nearly 25,000 aeroplanes have been added to the United States great air fleets by the Airplane Division of the Curtiss-Wright Corporation, U.S.A., since American aircraft production was stepped up in anticipation of the present world conflict. It is not permissible to state specifically the number of aircraft produced during the period of all-out production, but the company are allowed to reveal that between 1st January 1938 and 1st December 1943 the huge total of 16,795 machines were turned out by the Airplane Division's six factories. Of this number 6,080 were built before Pearl Harbour, a figure that reflects the sharp increase in production since the Japs attacked that Hawaiian outpost.

The Curtiss-Wright Airplane Division are now concentrating on the production of C-46 "Commando" transports, SB2C "Helldiver" dive-bombers for the Navy, and P-40 "Warhawk" fighters for the U.S. Army Air Forces.

Major R. H. Mayo, designer of the Short-Mayo composite aircraft, has been appointed Air Technical Advisor to Shipping Airlines Ltd., a new company formed by the 40 shipping companies known collectively as the Coastal and U.K.-Continental Air Group. The new firm are busy planning to operate air services between Great Britain and European countries.



The latest North American P-51 "Mustang," with the new "teardrop" cockpit enclosure. This machine is armed with six .50 calibre machine-guns. Photograph by courtesy of North American Aviation Inc., U.S.A.

Typing Letters Many Miles Away

Marvels of the Teleprinter

By H. F. Howson

EVER since written messages were carried by fast runners from place to place, people have been thinking out ways and means to speed up communications. To-day we have a machine which enables a person to read a letter at the actual moment it is being typewritten many miles away. Nothing, it seems, can be quicker than that!

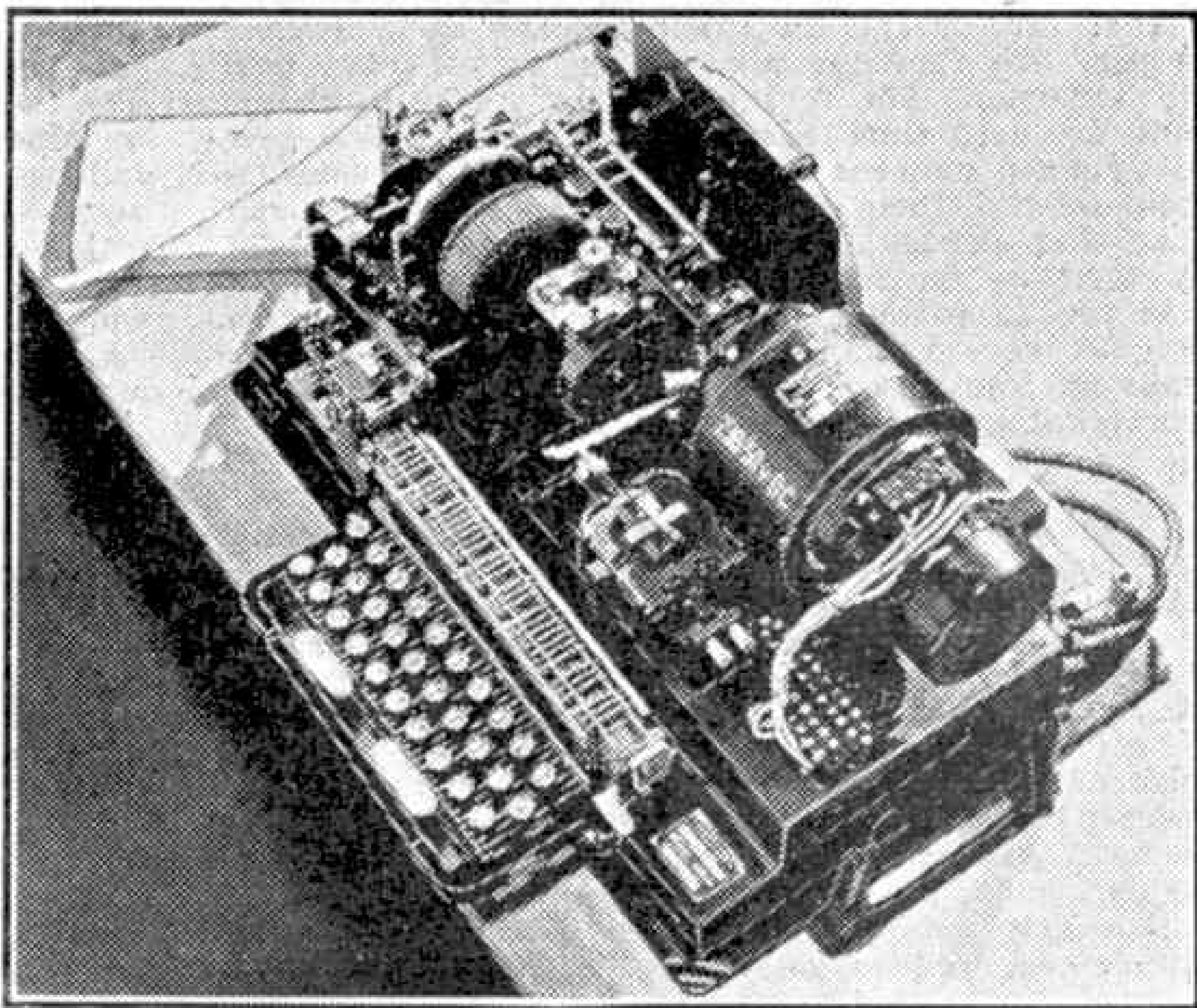
This ingenious machine is called a teleprinter. The one illustrated here is manufactured in England by Messrs. Creed and Co. Ltd., and in outward appearance resembles an ordinary typewriter. Under its cover, however, is packed an amazing quantity of intricate mechanism.

The teleprinter not only makes almost instantaneous written communication possible between two or more people many miles apart; it also ensures secrecy, for no other person but the sender and recipient handles the communication. An ordinary typist can send the message, tapping out words up to 66 per minute, which is almost as fast as most typists wish to type an ordinary letter for the post. At the receiving end the message is automatically typewritten in the receiving machine, each letter or figure appearing on the paper a fraction of a second after the sender has pressed the corresponding key in the transmitting machine.

An electric motor actuates the mechanism in each machine. Electricity carries the forwarding impulses over existing telephone or telegraph lines, and levers moving on the return-spring principle make contacts for sending the signals and operating the printer. The keyboard in both sending and combined sending and receiving machines is similar to that in an ordinary typewriter, except that numerals and letters are marked on most keys.

Briefly, this is how the machine works. When a key in the transmitting machine is depressed it makes an electrical contact to start the motor, thus bringing into

play a clutch which engages a rotating cam. An interlocking device ensures that no other key can be operated at the same time. The cam controls selecting levers, which move up and down to make contacts forming electrical impulses, on the same principle as the impulses formed when an ordinary Morse key is depressed. Each letter, or figure, known hereafter as a character, is made up of five such impulses, either positive or negative. If expressed in Morse one of them might



A teleprinter with the cover removed. This machine types letters that are read by the receiver, many miles away, only a fraction of a second later.

appear as — · · — —, for example, the dashes representing negative current. Each group is, of course, different. By operating the numeral key, signals can be sent representing the numerals marked on the keys, and pressing the "Letter Shift" key then brings all signals back to letters.

We have seen that the message is transmitted in the form of groups of five electrical impulses for each character, and now some explanation is needed as to how these impulses are transformed into typewritten characters at the receiving end. The process is rather more intricate, but it can be said that the first, or start, impulse actuates the motor in the receiving



A teleprinter operator pasting typed tape from her machine on a form.

machine, and the last impulse stops it. These two impulses are additional to the five character-forming impulses, but their main functions are to make or break an electro-magnetic contact.

In the printing portion of the receiving machine the type is mounted on horizontally moving rods arranged round a rotating cylinder, or typehead. The ends of the rods are struck by a small hammer head, jointed on to a lever whose movement is governed by a revolving grooved cam. Other grooves in the cam control levers that govern word-spacing, etc., and are referred to later.

The signals of five-group impulses from the transmitting machine flow through an electro-magnet in the receiving machine. Thence they are translated by a mechanical relay into a movement of a striker-pin past five fingers, setting them in a combination position that is a reproduction of the transmitted signal. A lifting of these five fingers in this combination moves five circular combs in such a manner that of the several notches cut in each comb, one in each is aligned. The combs are arranged round the type-head shaft and the alignment of the notches to form a slot allows a stop lever to drop. This arrests the revolving type-head in a position where the type corresponding to the signal is opposite the hammer-head. By the action of the hammer striking the selected type

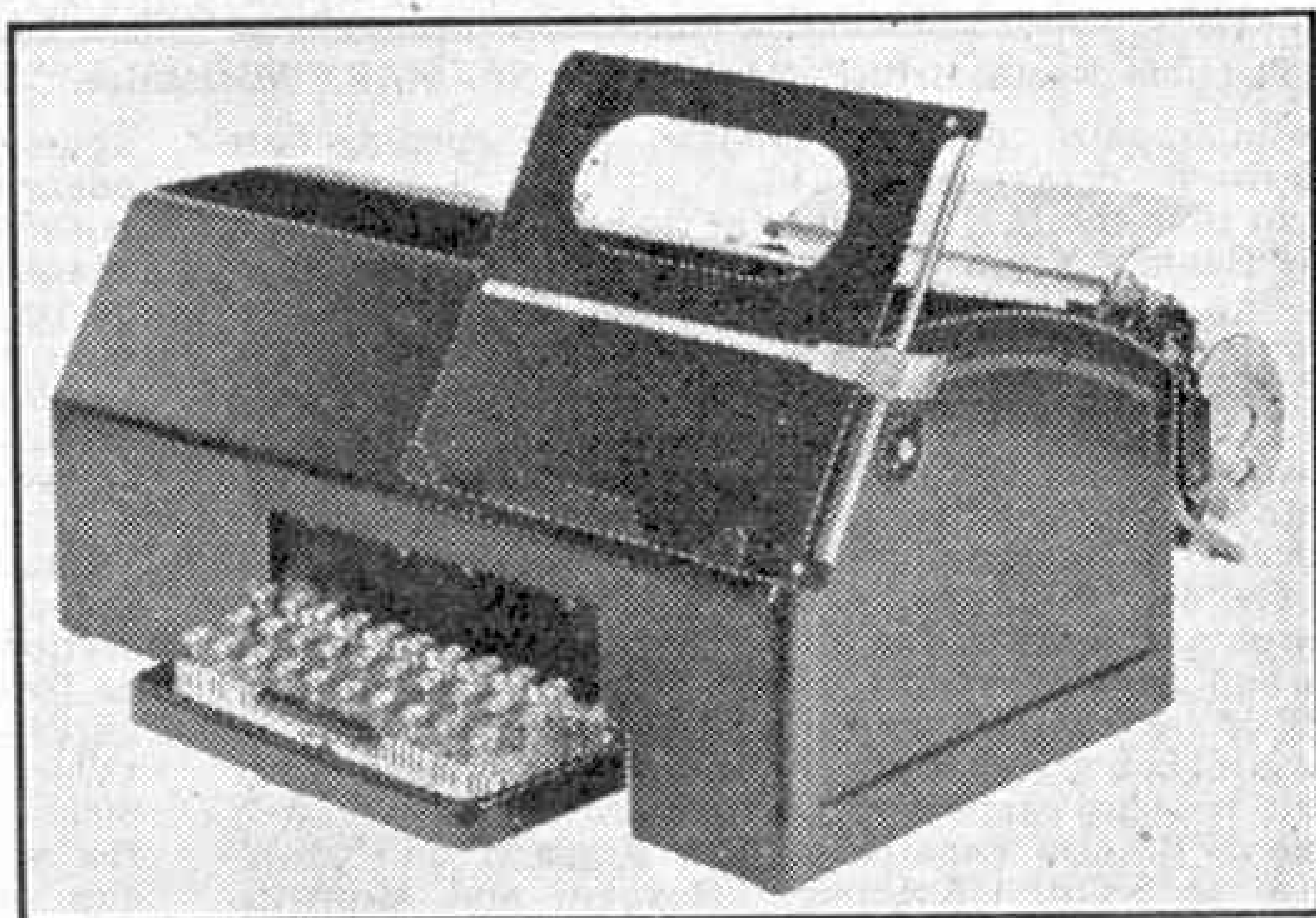
through an ink ribbon on to paper, one character of the message is then printed.

The whole movement may be compared to the turning of a knob on a safe-lock to the positions indicated by the combination number, only in this case impulses are substituted for numbers. It will be realised that the mechanism operates at great speed. This must be so for the machine to print twice as fast as hand-operated Morse, and it is made possible by hairbreadth timing and synchronisation.

The machine prints messages on ordinary sized letter paper, inserted into the machine in the form of a roll, and the completed communication is simply torn off against a knife-edge. All movements of the carriage, spacer, ink-ribbon and paper-feed are

coupled and automatic.

Let us imagine two machines in actual operation. Mr. A in London wishes to send a message to Mr. B in Liverpool, and desires an immediate reply. He first contacts Mr. B's office by telephone, and when contact is made, switches the telephone over to the teleprinter. To ensure that the Liverpool machine is correctly connected, he presses a key marked "Who are you?" and by so doing



A column-printing teleprinter. The illustrations to this article are reproduced by courtesy of the G.P.O.

actuates a certain portion of the receiving mechanism in Liverpool. Automatically this mechanism causes the Liverpool machine to transmit its own Exchange number back to London, where it is printed on the

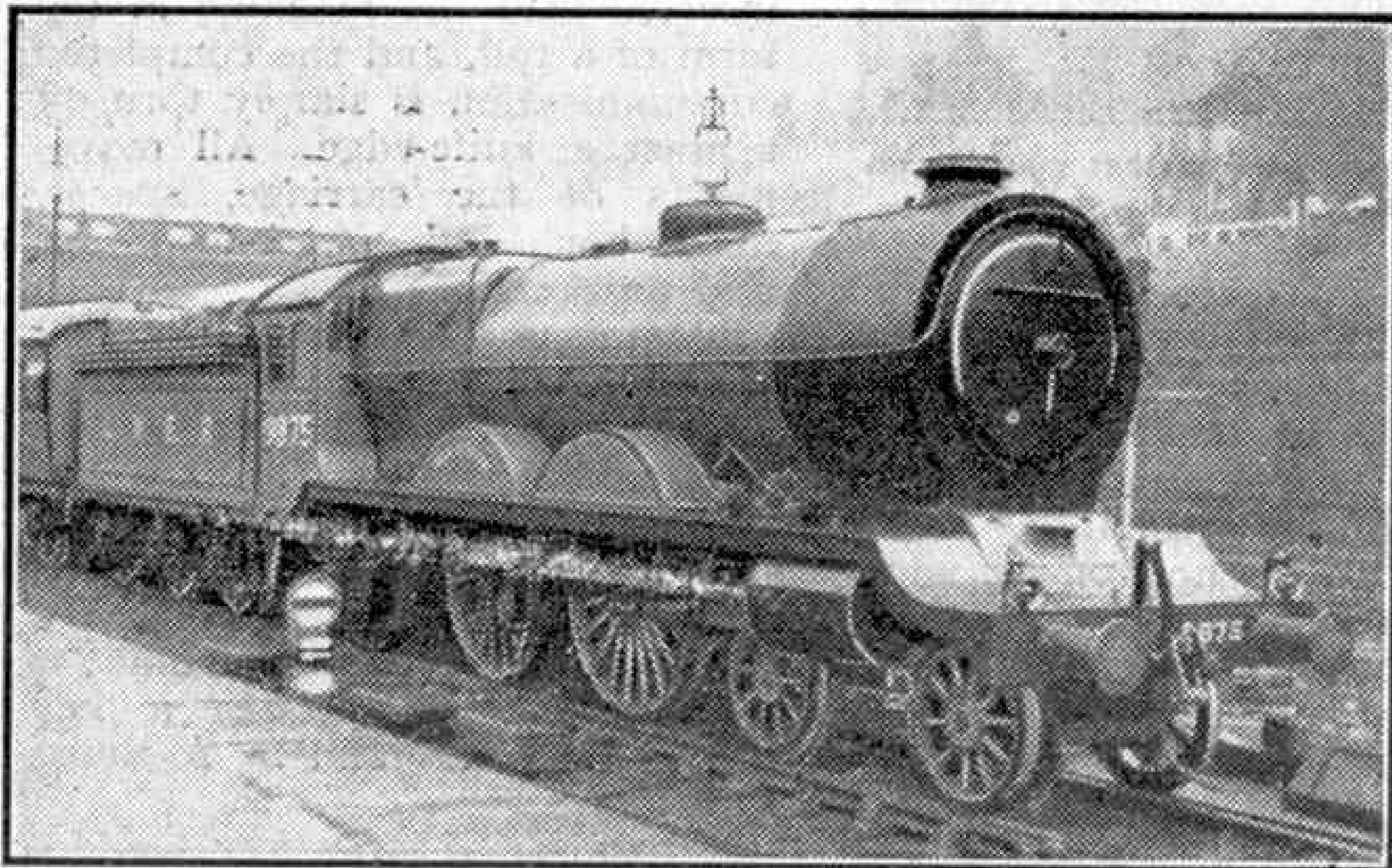
(Continued on page 394)

Railway News

Centenary of the "North British"

Prior to the grouping in 1923 there were five main Scottish railways, which had been formed by the absorption of small, local lines and also of course by development into new areas. For many years prior to 1923 these five companies had been the Caledonian, Glasgow and South Western, Highland, Great North of Scotland, and North British. The first three became part of the L.M.S. system, the other two are now part of the L.N.E.R.

The last named, the North British, was the largest Scottish railway, with about 1,378 miles of route. Just over 100 years ago construction began of its first section from Edinburgh southward to Berwick; actually this line, now part of the main East Coast Route, runs partly in an easterly direction and for a few miles north-easterly, as it follows the East



The last North British "Atlantic," No. 9875 "Midlothian" at Edinburgh.

Lothian coast round by Dunbar. The opening date for traffic occurred in 1846.

In time the N.B. became the northern partner, with the English North Eastern and Great Northern lines, of the trio of companies operating the East Coast Route from King's Cross, London, to Edinburgh, Glasgow, Mallaig, Perth and Dundee, and by means of running powers over the Caledonian, now L.M.S. from Kinnaber Junction, to Aberdeen. Some of the grandest mountain, moorland, loch, and marine scenery of Scotland is traversed or reached.

The steeply-graded Waverley route between Edinburgh and Carlisle was also N.B. property. It carried to and from the Midland line through trains formed of "M. and N.B." joint stock, painted crimson lake in Midland style, a stock interworking arrangement that is being carried on by the L.N.E.R. and L.M.S. The N.B. also penetrated into England on branch lines to Silloth, Rothbury, Hexham and Morpeth. On its main coast route northward from the imposing Waverley station in the Scottish capital to Dundee are found two outstanding engineering achievements, the Forth and Tay Bridges, over wide river estuaries near the sea, while there are many severe gradients, up and down which Mr. W. P. Reid's "Atlantics" and his 4-4-0s of the "Scott" and "Glen" classes held sway on principal passenger and mixed traffic workings until L.N.E.R. days, when ex-Great Central, Great Northern, and, later, various L.N.E.R. standard locomotive types began running over the N.B. section, which now sees all the latest and largest classes.

Apart from 0-6-0 goods engines for the more local and slower types of heavy duty, the N.B. relied entirely on four-coupled locomotives for main line work, so that double heading was prevalent. There were 22 of the fine named Scottish "Atlantics," built in 1906 or 1910 with the exception of the last two, which were much newer. As standardised by the L.N.E.R. they were class "C11," with 200 lb. per sq. in. boiler pressure and superheaters. All were withdrawn by 1939. Most of the "Scotts" and "Glens" are still at work. The former are now superheated rebuilds classed "D29/2," or "D30" in the case of those built between 1912 and 1920, with superheater and larger cylinders, but lower boiler pressure than their earlier sisters; the latter are similar to "D30," though provided with driving wheels 6 ft. in diameter instead of 6 ft. 6 in., for working over the steep climbs of the West Highland line. They are named after Scottish glens, while the names of the "Scotts" commemorate characters in Sir Walter Scott's novels. The principal passenger tank engines had the 4-4-2 wheel arrangement and we hope to illustrate and describe these next month.

At one time, many years ago, N.B. engines were

painted bright green. The finish afterwards became in the official description "dark gamboge," in other words it was brown with a suggestion of green in it. From about 1911 the final tint began to appear, being a dark olive-bronze green, that is dark green with a suggestion of brown or bronze in it. After 1914 most of the purely goods engines were painted black, while N.B. coaching vehicles were dark red. A few passenger locomotives were painted olive green experimentally round about 1921-2, and the old browner shade was also still to be seen about that time.

L.N.E.R. Locomotive Notes

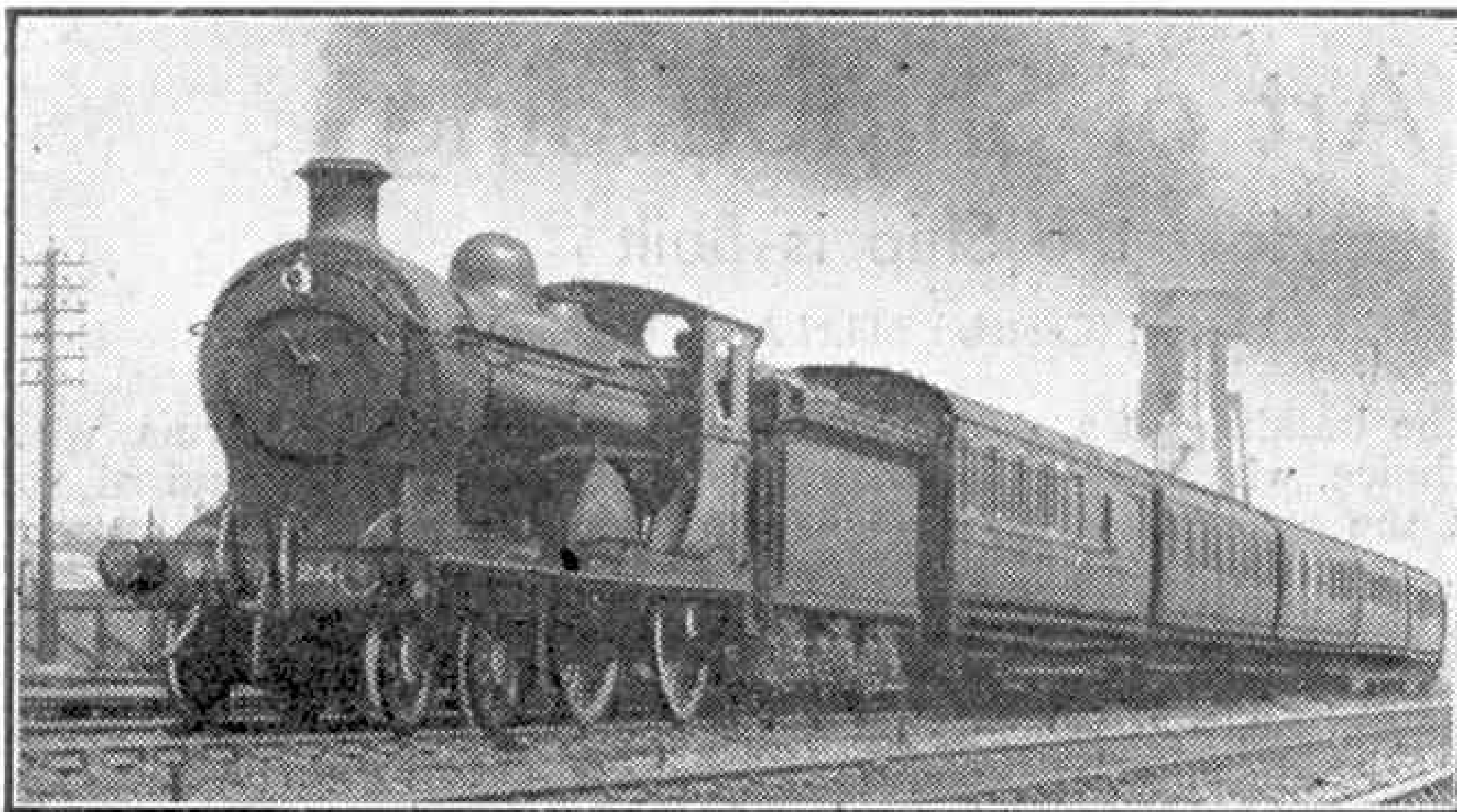
An interesting example of wartime co-operation between the railway companies is furnished by the

appearance of a new "hybrid" series of 2-8-0 freight engines. They are numbered L.N.E.R. 7651-70, with N.E. on the tender, but they are of the standard Stanier L.M.S. "8F" type and were built by the S.R. at Brighton! To conform to L.N.E.R. practice, they have mechanical lubricators and numbers painted on the buffer beams, and they are spread over all three areas. Apparently they are L.N.E.R. class "06." The works plate reads "L.N.E.R. Built S.R. 1944."

In order to avoid duplication of numbering, those "Claud Hamiltons" that had been renumbered 76xx under the scheme partially introduced on the G.E. section in 1942 revert to 87xx or 88xx. A new series of Diesel shunting tank locomotives with power units supplied by the English Electric Co. Ltd. is being turned out at Doncaster, numbered 80xx. Nos. 8000-1 have been seen at Stratford. On that account the original batch of 0-6-2 suburban tanks built by the former Great Eastern, lately class "N7" and numbered 8000-11, are being given the new numbers 7978-89. More of those "N7" tanks that had Belpaire fire-boxes are being rebuilt with round-top boilers, so bringing them into line with the "N7/3" 26xx series built at Doncaster.

An all-line re-numbering scheme for all engines has been prepared and will probably be put into effect as soon as times are propitious; in this locomotives of a type will be numbered together starting at No. 1 with the principal express passenger classes.

New "B1" Thompson 2-cyl. 4-6-0s Nos. 8309 "Kudu" and 8310 "Hartebeeste" are working in the



L.N.E.R. "Scott" 4-4-0 No. 9245 "Baillie Nicol Jarvie," class "D29/2," on a Stirling train. Photograph by courtesy of the L.N.E.R.

N.E. area from Leeds. "B1" boilers have been fitted to several "02" 3-cyl. 2-8-0s and also to a "Sandringham" 4-6-0 No. 2864 "Liverpool." No. 8304 "Gazelle" has been working regularly between Cambridge and King's Cross, kept very clean as the Royal engine. Further rebuilds include "04" to "01," Nos. 6334, 6507 and 6630; "Q4" to "Q1" 0-8-0T, No. 5087; "P2" 2-8-2 to "A2" 4-6-2, Nos. 2001, 2002 and 2006. We are glad to hear that the fine old Scottish names of the "P2s" are being restored. N.E. 4-6-0 mixed traffic "B16" No. 2377 also has been converted to "B16/3," with three separate sets of Walschaerts gear, like No. 922 illustrated in the September "M.M."

There appear to be 14 "B12/3" G.E. 4-6-0s allocated to a "pool" for working ambulance trains to any part of the country. They are often seen on G.W., L.M.S. or Southern metals, sometimes assisted by various types of locomotives belonging to those companies. "B12" Nos. 8521 and 8531 recently returned from Scotland to Ipswich. Class "D13" is now extinct.

The West London Railway

The West London Railway is nearly 100 years old. Together with the West London Extension, completed in 1865, it forms a seven-mile ring line round west and south-west London from Willesden to Clapham Junction and Battersea, and is now jointly owned and operated by the G.W., L.M.S. and Southern companies. London Passenger Transport Board and L.M.S. electric passenger trains traverse a part of it, and L.N.E.R. freight trains work through to the Southern that way now, so that it is one of the most cosmopolitan railways in Britain, being invaluable as a means of interchange between all companies' routes, capable of carrying express engines, heavy freight locomotives, and nearly all types of main line rolling stock. Passenger services of the regular public type are considerably reduced under present conditions, but the "West London" is in great demand as a freight and special traffic route. It serves a number of milk and goods depots into which the three owning lines work trains with their own rolling stock and crews.

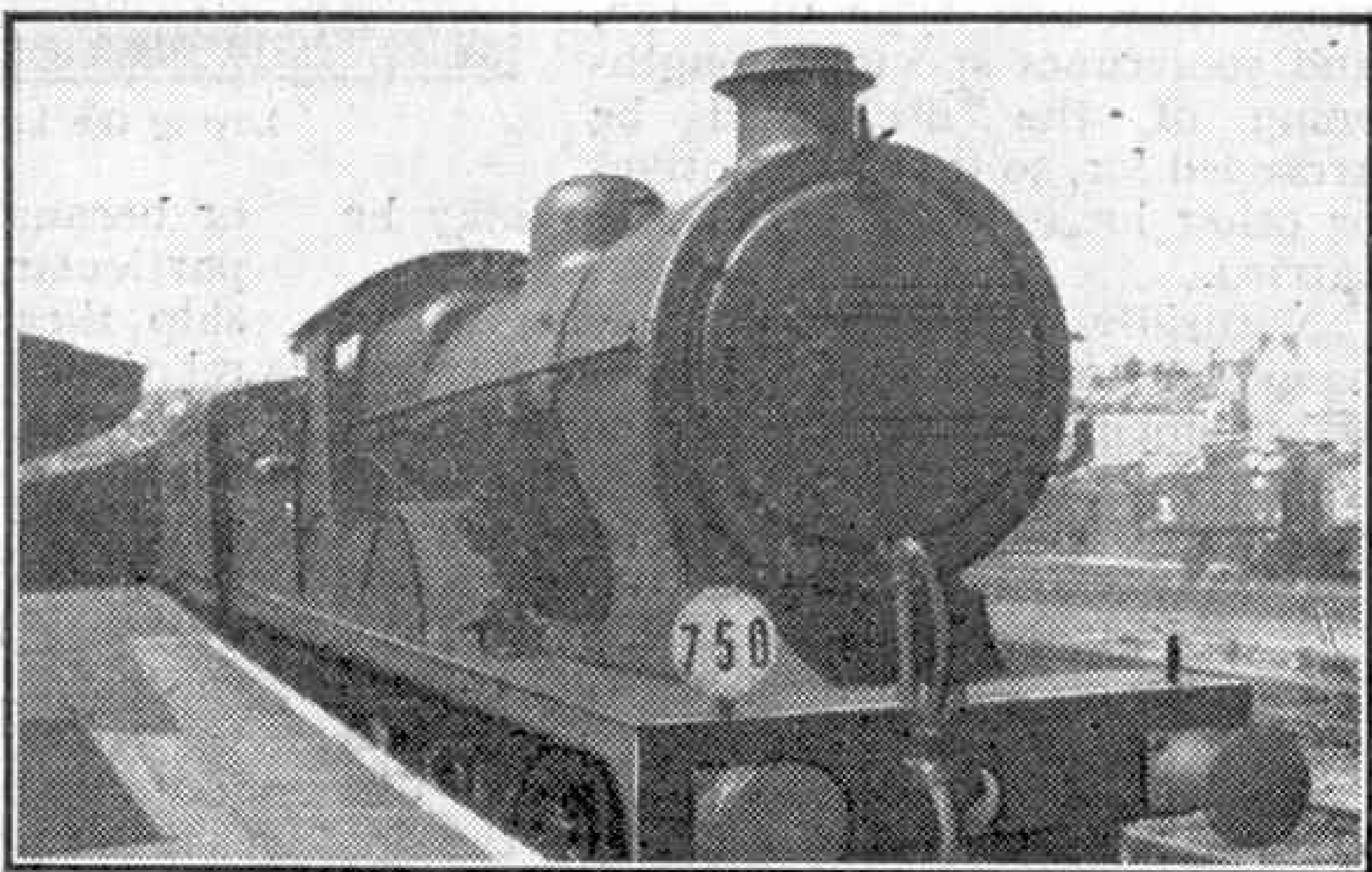
The principal intermediate station, Kensington (Addison Road), is an imposing edifice with long and spacious platforms such as the number of passengers seldom justifies although large crowds used

to be handled on the occasion of special events at Olympia. On a number of holiday eves in the past, special G.W.R. expresses to Devon or South Wales have been started from Kensington, while for a time years ago a through fast train was run by that company from Victoria S.R. Eastern Section terminus, in which the G.W.R. had then an owning interest, to Birmingham, via Battersea, the West London line, and Old Oak Junction.

Before the advent of cross-London motor bus and tube connections, several now almost forgotten suburban steam services ran over the "West London," operated for instance by the former London and

South Western, and London and North Western Railways. Many readers will remember the "Sunny South Express" formed of L.M.S. corridor stock, including a restaurant car, that until the outbreak of war ran daily during summer, and at weekends in winter, from Liverpool, Manchester, Birmingham, Nottingham, etc., to Brighton, Eastbourne and Hastings. A portion or separate train for Margate and Ramsgate was also part of the service on certain days. S.R. locomotives worked through by means of the West London connecting link between Willesden, L.M.S. and Brighton or Ramsgate. The northbound "Sunny South Express" headed by a Brighton "Atlantic" was illustrated leaving Brighton for Willesden and the L.M.S. main line in our July issue.

Engines seen on this joint line to-day include 2-8-0s of the L.M.S., British and American W.D. types, Southern and G.W. 2-6-0s, "Halls" on West of England milk trains, L.M.S. 0-8-0s and 0-6-0s in variety, modern or not so young, hailing from Eastleigh, Brighton, Ashford, Derby, Stratford and so on. Then there are those powerful Southern 2-6-4 tanks of class "W" built specially for freight transfer work in the London area. Representatives of many other classes may turn up, particularly from the



Through train from the West London line hauled by S.R. "L" class 4-4-0 No. 1768. Photograph by N. R. Harvey.

Southern end, including express locomotives and suburban tanks.

The use of loudspeakers is being extended at "tube" stations, main line junctions and also in certain shunting yards.

The Art of Shipbuilding

II—How the Ship is Built

By Denis Rebbeck, M.A. (Cantab.), M.I.N.A., A.M.I.Mech.E.

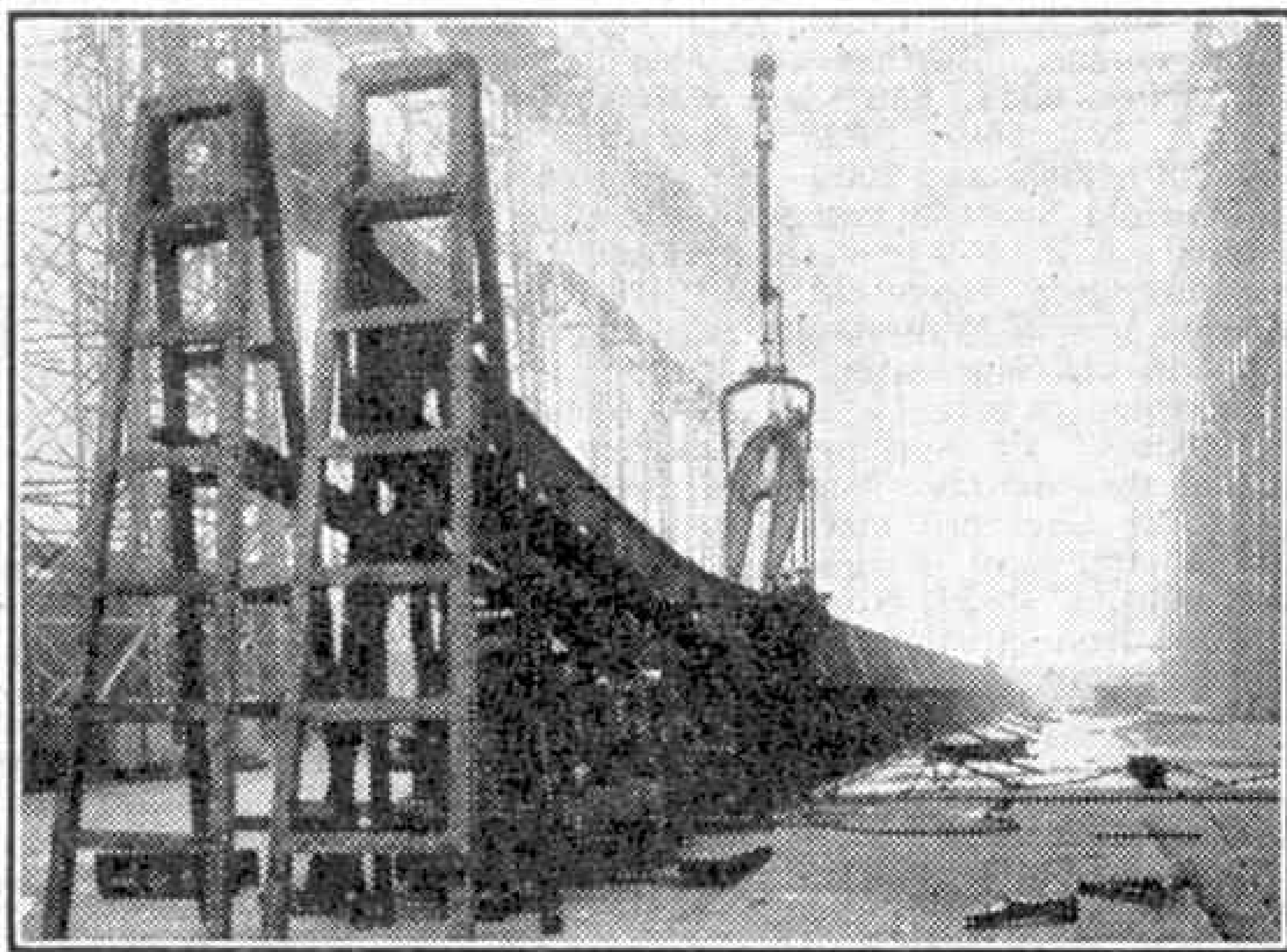
THE very first step in the building of a ship is naturally the choice, which the shipowner must make, of the exact type of ship which he requires. By this we do not mean that the owner must make up his mind as to whether he will have a passenger liner or a cargo ship, for that is automatically decided by the type and business of the ship-owning company. But if, for example, the owner requires a large cargo liner, he must decide the exact length and beam; the speed required; the type of propelling machinery favoured by his company or recommended by the builders, that is whether the main engines shall be, broadly speaking, steam or Diesel. And after this decision has been taken the further details of machinery and engine room equipment will be settled.

It is hardly likely that the question will arise as to whether the ship will be refrigerated or not, as this also is settled by whatever is the company's normal business; but it may be decided to design the cargo holds so that they may take more than one type of cargo, and sometimes special strengthening of the deck will be arranged for, so that locomotives or other heavy deck cargo loads may be carried.

Naturally, although the owners may have very firm ideas about the general arrangement and broad outlines of design of the ship which they require, they will seldom be so autocratic or conservative that they will not be open to suggestions and recommendations on the part of the builders, who may be in a position to give excellent advice on some particular points arising from their wide experience. In general, however, it will fall to the lot of the owners to decide on the type of ship which is wanted to suit their requirements, and they will fix the dimensions of the ship, its capacity for carrying cargo, and its power and speed.

The next step will be the inviting of tenders from several shipbuilding firms,

either from some particular firms who specialise in the type of ship required, or maybe from firms for whom the owners have a particular regard because of previous satisfactory experience, or maybe even from a fairly large number of firms in the hope of getting a cheap ship. Some owners place orders for their ships with certain shipbuilding firms for other reasons. For instance, they may order the ship from some foreign shipbuilder because of "frozen assets" in that country,



Laying the keel of a large passenger liner.

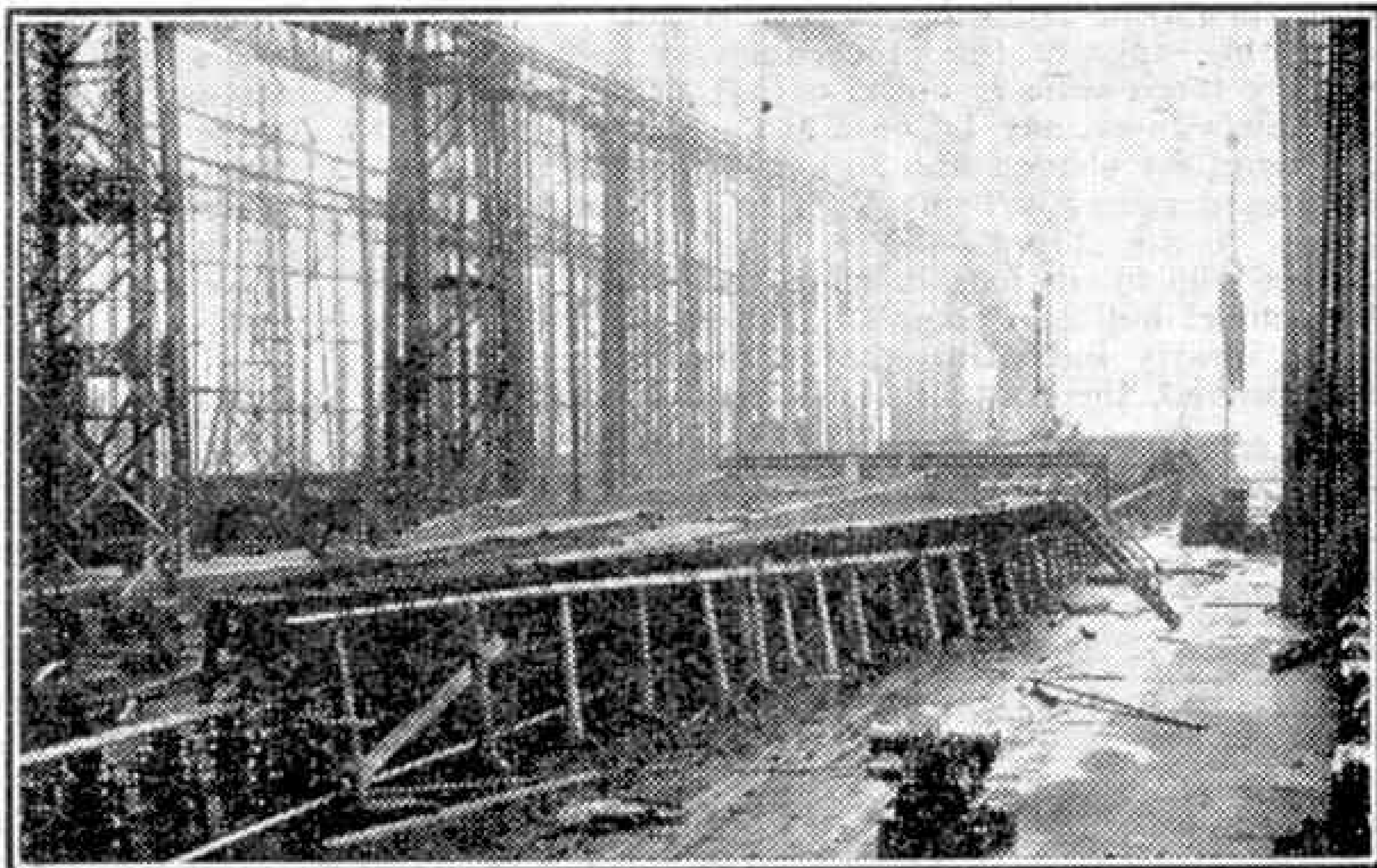
or because they hope to trade with that particular country, and by building their ship there they anticipate future cordial relations with the government and industry of the country concerned. Finally, they may chose to build their ship in some particular port, as is sometimes done in the case of cross-channel boats, and then use that fact for advertising value when the ship is put in service and sails from the port of origin either daily or at frequent intervals.

After the tenders have been received and the builder decided upon, the successful firm is ordered to make complete detailed drawings. This, of course, involves a tremendous amount of work and takes a considerable time even for comparatively small and straightforward designs of ships; while if the new ship is a large passenger

liner, the drawings of hull and machinery will run into hundreds. The naval architect will spend long hours in close consultation with the marine engineer and chief technical men, with the superintendent of the owners, and with the heads of the passenger, freight and catering departments. All the hundred and one points which arise must be thoroughly and exhaustively gone into so that each interested party gets what he requires in the general layout of the ship.

Naturally the ship must be designed so that it conforms to the various Board of Trade regulations, and this calls for experience and vast knowledge on the part of the drawing office personnel. Before the advent of Board of Trade regulations, Lloyd's requirements, etc., the designer had almost a free hand in the development of his own particular ideas, but all that has changed so that safety at sea shall be of paramount importance.

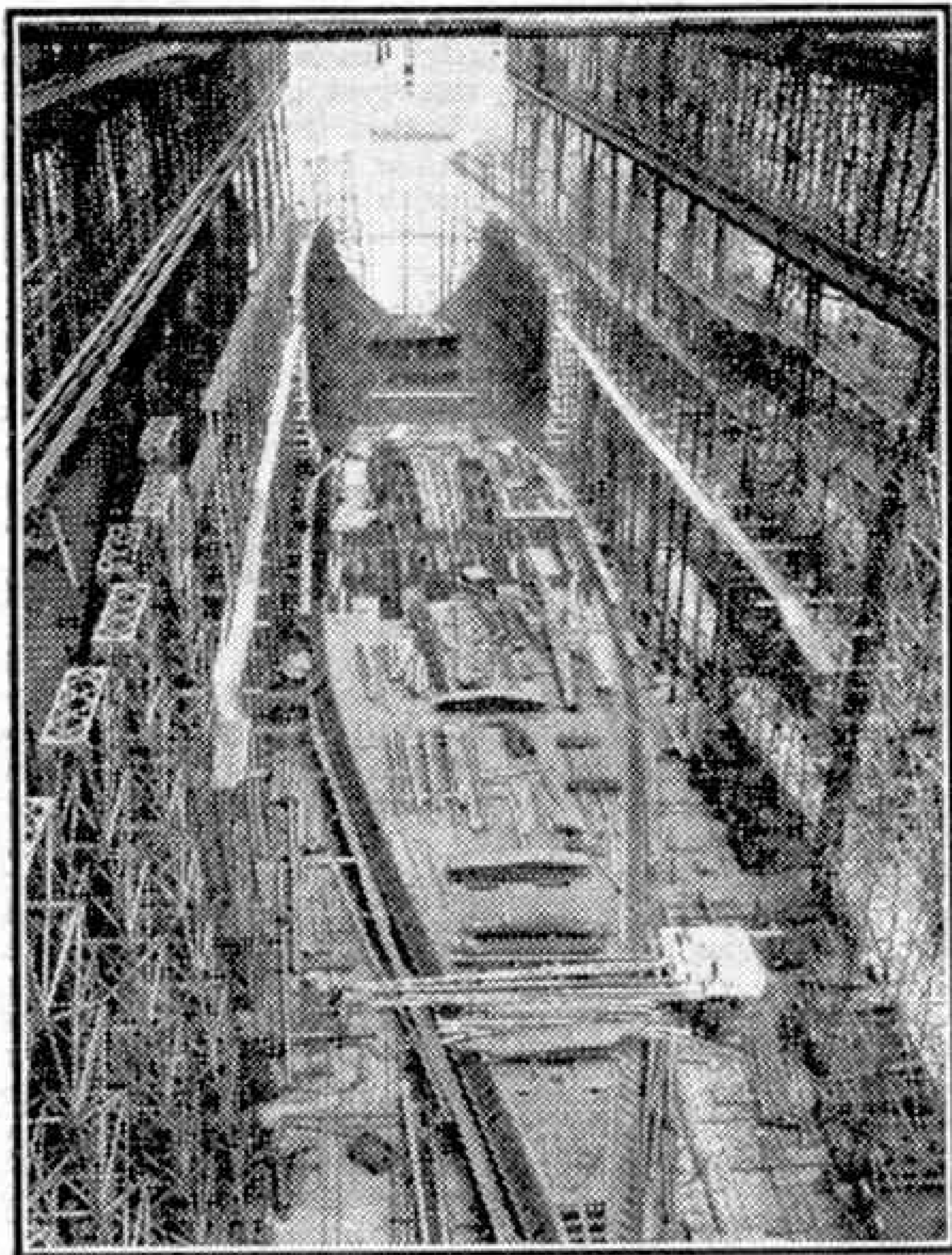
After preliminary plans of the ship have been prepared in the various drawing offices, there will follow meetings and still



The double bottom framing.

more meetings, and it is here that the tact and ability of the builders' representatives can smooth over the many difficulties and debatable points which are bound to arise. The shape and design of the hull will be carefully considered so that the resistance of the hull as it is propelled through the water will be reduced as much as possible. The seaworthiness and steadiness of the ship in a rough sea is of particular importance in a passenger ship if the owners are to please the travelling public for whom they are catering. Even speed may be sacrificed in order to secure maximum comfort, because a ship which gets a good name and pleases the passengers is the best advertisement an owner can have.

At this point may be mentioned the value which some shipowners place on the use of model tanks for developing new and efficient hull designs for their ships. Most shipowners and shipbuilders are well aware of the advantages to be obtained from the use of experimental tanks for testing models of ships. By this means, established by the late Dr. William Froude, models embodying new ideas, or models which are simply modifications of more traditional forms, may be tested for a comparatively small sum, and notable improvements attained. The first tank of this kind was established at Torquay in 1872, and was for the exclusive use of the Admiralty, although merchant shipbuilders benefited by the reports when they were published. The first tank built for a private shipbuilding firm was opened in 1883 at Dumbarton, and is the oldest in the world. There are now several tanks in Great Britain, probably the best known being the one at Teddington;



Double bottom nearing completion.

and countries abroad interested in shipbuilding all have their own tanks for model testing.

At this stage of the proceedings, a half model to a fairly large scale is built so that final approval of the ship's lines may be obtained. This model is cut and carefully shaped and formed from the solid, the scale used generally being $\frac{1}{4}$ in. to the foot. In other words, if the ship is 400 ft. long, then the model will be 100 in. in length, which is certainly no toy! The model hull is a complete half-ship from stem to stern, clearly indicating the profile at every point. If approved, the contour of the model vessel is care-

stem bar and the stern frame respectively. These massive steel forgings are riveted in place at a later stage of construction and materially assist in the strengthening and stiffening of the hull structure at these particular points. The keel plates are brought from the material storage yard to the platers' shed, where they are marked to size and then cut to the marks in large shearing machines—the name of the machine clearly indicates its function—then the edges of the plates are chamfered as required. After this the rivet holes are punched in large one-man operated punching machines in which the operator, who is seated above the plate, deftly moves it over a succession of rollers so that the white circles indicating where rivet holes are required are brought quickly and accurately under the punching tool.

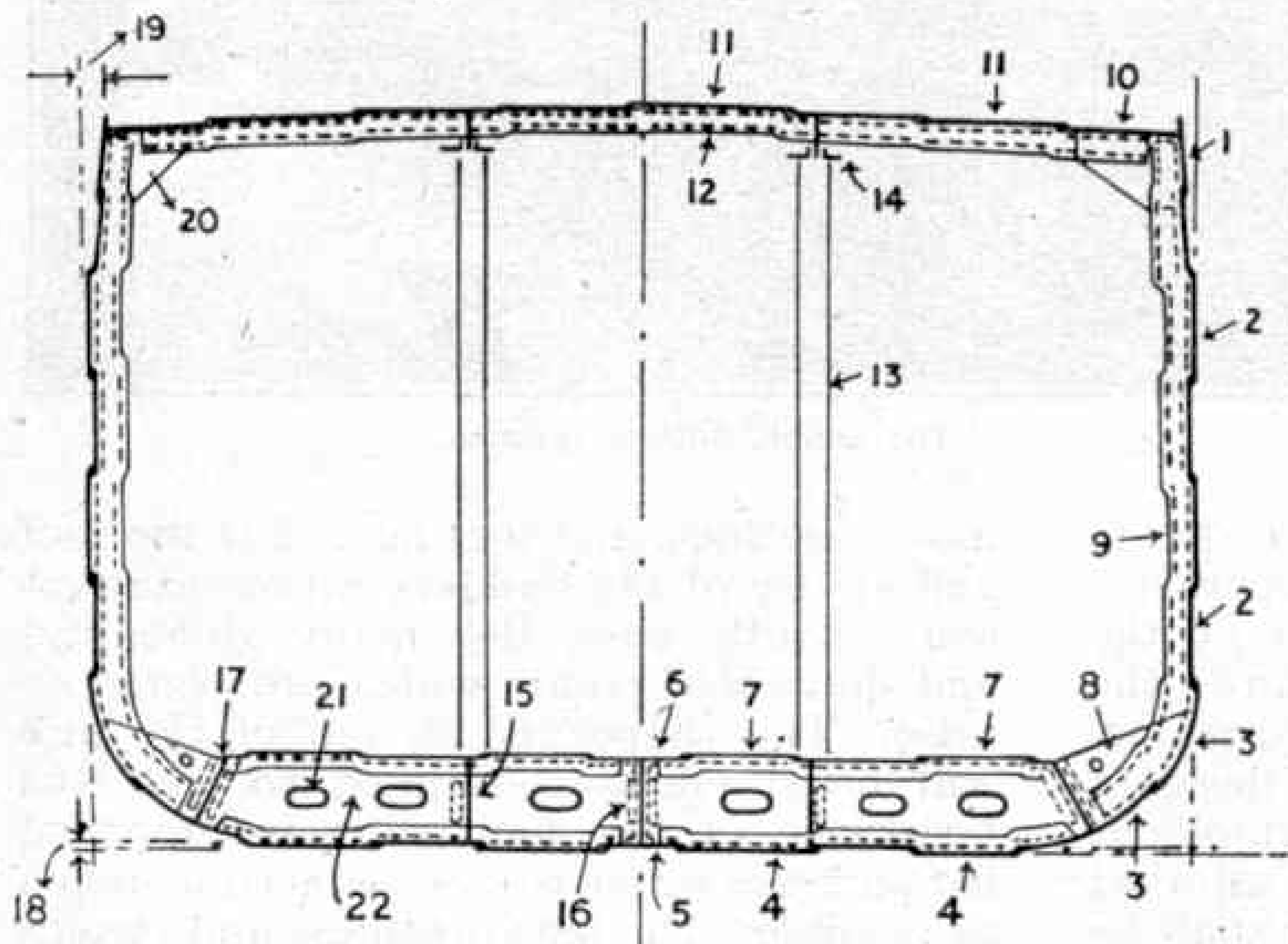
The keel plates are assembled in position on the keel blocks, where they are held together temporarily by nuts and bolts, enormous numbers of which are used in the construction of a ship, and incidentally the salvage of which always presents quite a problem. The next operation consists of riveting these plates together, and for this work a huge hydraulic riveter is employed. This powerful machine is suspended from a crane, and looks like the jaws of some prehistoric monster hanging in the air. Due to its size and the use of hydraulic power, enormous force is brought to bear on the rivets after they have been inserted in the holes of the plates which are to be joined together, and the rivets are literally squeezed up tight—this operation always strikes the observer as being a very impressive one.

The rivets are heated to a red heat in coke fires through which air is blown, either from the works compressed air system or by foot-operated bellows. The glowing rivet is picked out with tongs and deftly thrown by a heater boy to the holder, who catches it and inserts it in the rivet hole through the plates. The latter (in later stages of the ship's construction) holds the rivet in place, and the other end of the rivet is beaten down either by a man using a pneumatic hammer or else by two men who strike alternate blows with long hammers. The marvellous timing of these men is one of the sights not to be missed when going through a shipyard. It is quite an art, and comes from years of experience. The hammering down of the small end of the rivet forms the second head, and as the rivet cools it naturally contracts, and in consequence holds the plates firmly together. Mention should be made here of the terrific noise which riveting produces; one is almost deafened by it if inside the hull when the construction has reached a later stage.

Steel plates held by angles and forming the vertical keel are next assembled and riveted in position. After this, vertical angles are fixed to the vertical keel plates at 3 ft. intervals, and to these bars the floor plates are connected. These floor plates are carried out on both sides of the keel and as the bottom of the ship gradually takes shape. This construction, of the ship's bottom, is carried on numbers of short, stout timber poles called shores, and these help to carry the weight of the ship. Before these vertical keel plates leave the platers' shed they have large oval holes, called manholes, cut in them, so that when the ship is finished a man can get from one compartment of the double bottom to the next for painting, inspection and so on. There is also the advantage of a certain saving in the weight of steel.

A very important stage is now reached, and that is the framing of the hull. Long steel angles like ribs are heated in long, low furnaces in the platers' shed to allow them to be bent to the various predetermined shapes for

(Continued on page 394)



Section through ship, showing details. 1, Sheerstrake; 2, Side plating; 3, Bilge plating; 4, Bottom plating; 5, Keel plate; 6, Tanktop centre strake; 7, Tanktop plating; 8, Bilge bracket; 9, Frames; 10, Deck stringer plate; 11, Deck plating; 12, Deck beams; 13, Hold column; 14, Deck girder; 15, Tank side girder; 16, Centre girder; 17, Tank margin plate; 18, Rise of floor; 19, Tumble home; 20, Beamknee; 21, Manhole; 22, Floor.

fully transferred to the drawing boards, and the section at each frame carefully developed. When these plans are completed and checked, the appropriate department in the firm is in a position to assess the material requirements and proceed with the placing of orders. So we have now reached the position where the shipyard itself, that is the sheds and shops and working men, will soon begin to take an interest in the construction of the new vessel.

After a launch from a slip has taken place there is an enormous job for the workmen to do in clearing all the debris from the slip, which is made up of relics from the previous construction. This clearing entails the moving of large amounts of timber, etc., and generally takes quite a while to complete. Then follows the building up and lining up of the keel blocks, massive timber blocks which will carry the keel of the hull which is to be built on this site. The top level of these blocks when finally lined up must have the same declivity as the slip, for obvious reasons, and naturally demands careful and accurate setting up and alignment. After this important task is completed, the actual laying of the keel commences, and the construction of the hull has at last begun.

Most of us think of a keel as a large plate such as is fitted to yachts, and some of us may consider the keel as being a huge solid bar of steel extending from the bow to the stern. As a matter of fact the keel of a steel ship is nothing like either of these, but is in actual fact a succession of flat steel plates suitably riveted together and shaped into a gentle curve at the forward and aft ends of the long centre portion which constitutes the main part of the hull. The bending of the plates forward and aft is done so that a recess is formed which will accommodate the

Photography

Portraits with Photoflood Lamp

By E. E. Steele

NOW that the damp and dreary days of November are here most amateurs like to try their hand at indoor work, and usually this means portraiture. This once difficult job is now made much easier by the fast films obtainable, and above all by that boon of photographers, the Photoflood lamp.

This lamp, which fits into an ordinary lampholder, is so designed that it can be deliberately "over-run" to the extent of as much as 60 per cent. Thus it gives a very much more brilliant light than an ordinary lamp, but at the cost of a greatly reduced life. The normal life of a Photoflood lamp is about two hours, but as the lamp need be used only for a few seconds at a time during the actual exposure, a large number of photographs can be taken before it burns out. Focussing can be carried out by the ordinary room light. Photoflood lamps can be obtained from most good photographic dealers, and they cost only two shillings each.



Brother looks down his microscope.

Such strong lighting will of course cast heavy shadows. It can be diffused, or a reflector such as a sheet of white cardboard can be used on the opposite side to throw some light back into the shadows, or another lamp may be used for the same purpose. Watch the shadow under the nose and see that it is to one side; then you will be sure of getting good relief or modelling. The old three-quarter lighting is best for simple studies. Have the main source of light, that is the Photoflood lamp, at an angle of about 45 degrees to the sitter, and rather higher, keeping it at least 10 ft. away. If the lamp is placed in front of the sitter you will get a flat lifeless result.

Personally I like to have my subjects doing something in which they are interested, as a more natural expression results. For a posed shot, see that the



Sister touching up!

background is as plain as possible; a distempered wall does very well for the purpose. Sometimes, of course, it is desired that the background shall include familiar objects of the room.

Exposure may seem a problem at first, as it depends upon so many factors. The lightness of the walls, for instance, may make quite a difference. For first experiments, with a medium panchromatic film and lens aperture of F8, try an exposure of one or two seconds. The result will serve as a guide for future work. An ordinary box camera is likely to have a lens aperture of F11 or smaller, and four seconds would be a suitable trial time. A portrait attachment is of course necessary with fixed-focus cameras of this type in order to bring the sitter into sharp focus at close range.



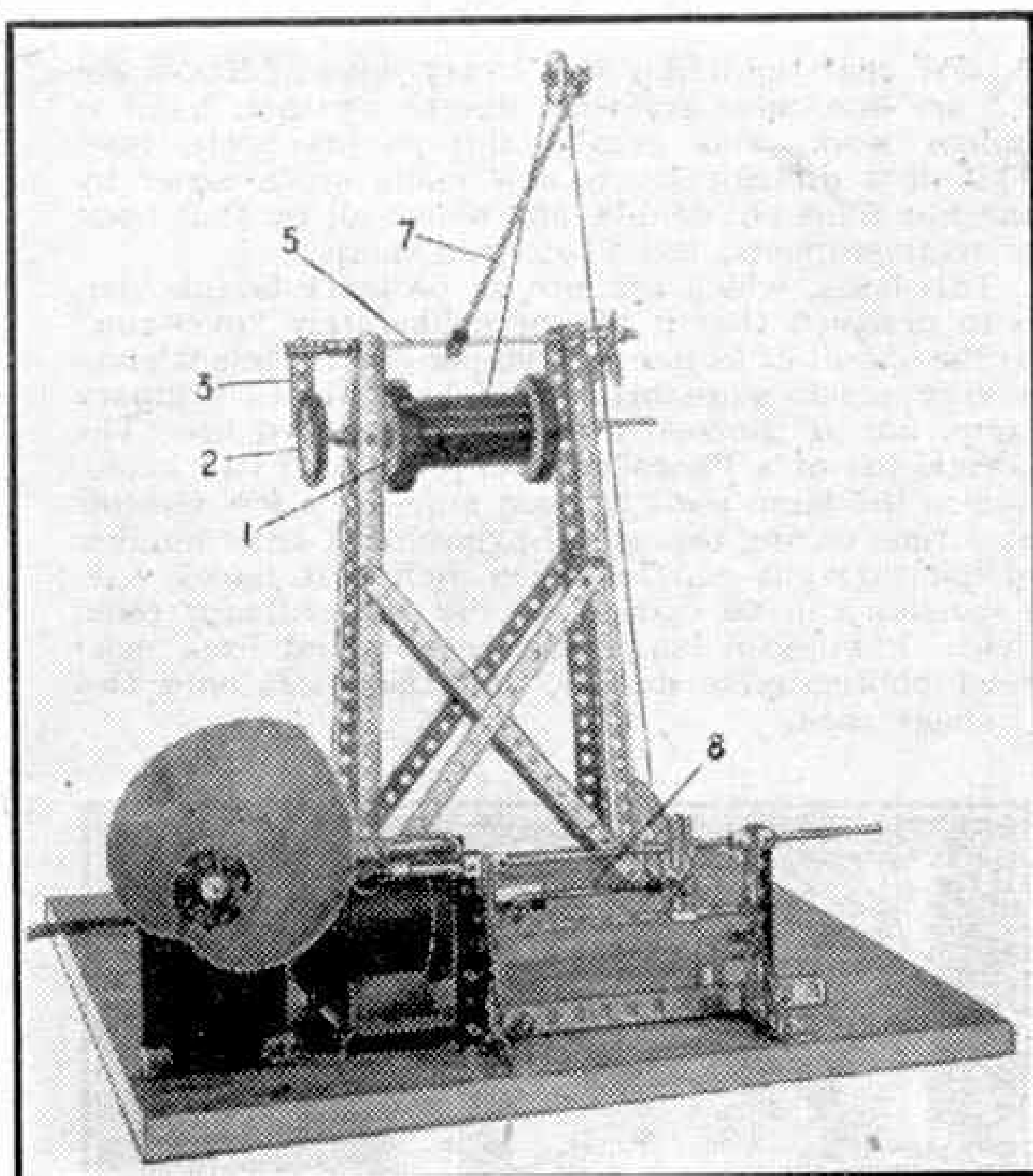
Father trims a neighbour's hair.

Meccano Helps with a War Job

How a Coil-winding Machine was built

READERS are aware that the Meccano factory and the wonderful machines that in peacetime turned out the famous Meccano parts, Hornby and Hornby-Dublo Trains, Dinky Toys and other products of Meccanoland, are now devoted entirely to important work for the war. In the March "M.M." the Editor referred briefly to some of the many ways in which Meccano was helping the war effort. Here is an interesting example of wartime help given by Meccano in the factory where it was made.

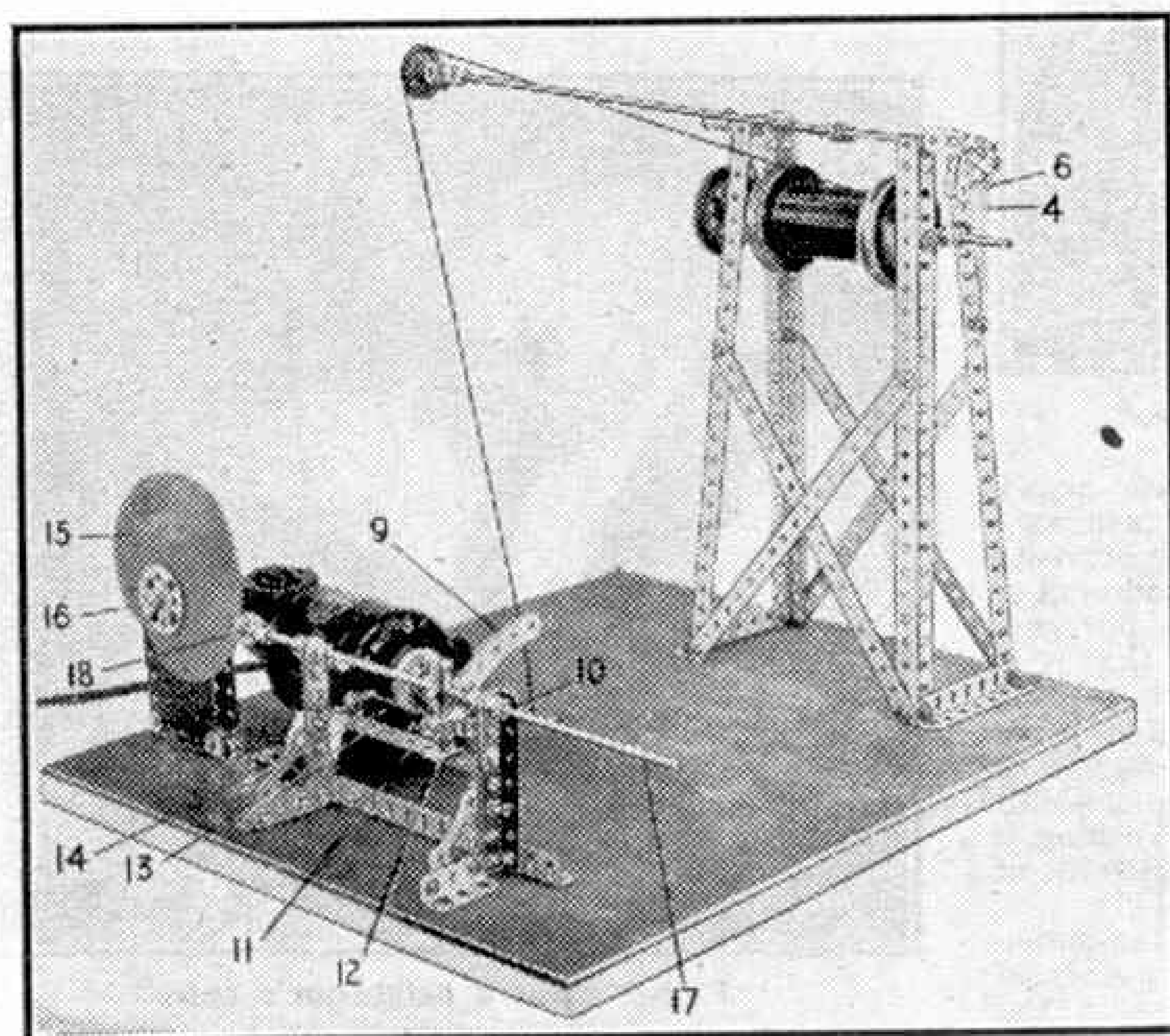
A few months ago the factory required to produce a very large quantity of small electrical bobbins that had to be wound with hundreds of yards of extremely fine wire. Coil winding is of course nothing new to the Meccano factory, which is fully equipped with specially-designed machines for winding the many different types of coils required in Meccano Transformers and Hornby Electric Trains. It was found, however, that the existing coil-winding plant was unsuitable for the special job owing to the extreme fineness of the wire involved. Each coil had to be wound with 14,000 turns of No. 42 S.W.G. enamelled wire, and this is so delicate that it could not be



handled on the ordinary machines without danger of snapping. It was therefore necessary to devise a more suitable form of machine, and this job fell to a member of the technical supervisory staff who in peacetime was in charge of the Meccano Model-building Department.

In order to work out a suitable mechanism it was natural that this expert should make use of Meccano parts, and with the aid of these he was able to try out quickly various ideas. Finally he succeeded in designing almost entirely in Meccano a really suitable full-size machine that met all requirements. This basic model was then used as a pattern for the construction of a number of machines on which the actual job was done with perfect success. The great advantage of using Meccano parts in carrying out the experimental work and producing the basic model was a considerable saving in time and expense.

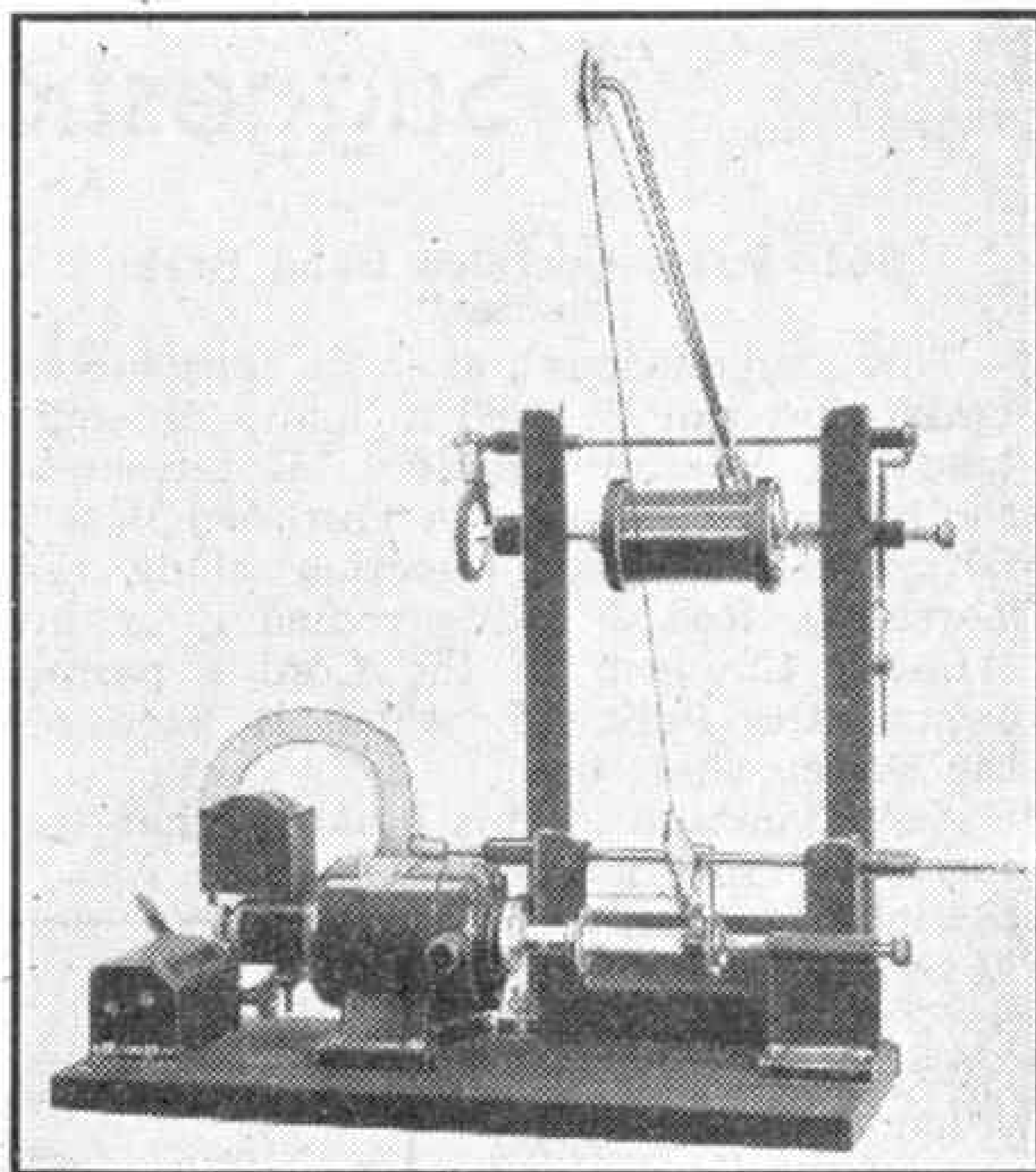
The Meccano model is shown in the illustrations on this page, and the actual machine



in the third picture. It will be seen that the machine is an almost identical copy of the model in every main feature.

The model is driven by a Klaxon Electric Motor running at a speed of 5,000 r.p.m., and is capable of turning out about 20 completely wound coils per hour. The bobbin of wire 1 that forms the stock is mounted on a spindle 2, which is free to revolve except that a light friction brake is incorporated to prevent the wire from over-running as it is withdrawn at high speed. This brake consists of a 1" Pulley shod with a Rubber Tyre, and contacting this Tyre is a short Strip 3 fixed to a Coupling on the Rod 5. This Rod carries also another Rod 7 at the extremity of which is a guide pulley formed from two $\frac{3}{4}$ " Discs. The wire is led from the bobbin through the guide pulley and thence passes through a feed guide formed from two Curved Strips 9, which lead and feed it on to the core of the coil. The latter is mounted on the shaft 8, which is coupled direct to the main output shaft of the Klaxon Motor and runs at a speed of 5,000 r.p.m.

In order to feed the wire evenly along the core, and wind each turn close up against the one before it, a special feeding device was necessary. This consists essentially of a heart-shaped constant feed cam 15, cut from a piece of sheet metal, which is fixed on the secondary shaft of the Klaxon Motor and rotates at a speed of 100 r.p.m. This cam contacts a $\frac{1}{2}$ " Pulley fixed on the end of the Rod 17, which carries also the Curved Strips 9.



As the cam turns through the first half of a revolution, it pushes the Rod 17 forward at a constant rate, so carrying the wire evenly across the length of the coil core. As the cam turns through the second half of its revolution, Rod 17 is drawn backward by a Spring 14. It will be seen therefore that for each revolution of the cam two layers of wire are wound on the coil. The cam is designed to give a rate of feed of $\frac{4}{1000}$ " for each revolution of the main shaft of the Electric Motor, on an extension of which the core of the coil is mounted.

The "Roman" Road on Blackstone Edge

THE appearance in the "M.M." for February last of an article describing the "Roman" road on Blackstone Edge has had an interesting sequel. The general belief that the road is Roman was challenged by Mr. J. L. Maxim, Rochdale, and here we give an extract from his letter on the subject.

"The short stretch of about $1\frac{1}{2}$ miles of paved highway on Blackstone Edge is by no means proved to be Roman at all, although that is the popular notion, based largely upon a paper by Dr. H. C. March given to the Lancashire and Cheshire Antiquarian Society, published in their first volume in 1883, and which others have tried to support. The claim that it is 'the finest Roman road remaining in Western Europe' is an unwarranted assumption, nothing of an undoubted Roman origin ever having been found on or near to it. Its proximity to and parallelism with an authentic old pack-horse track or causeway from Rochdale to Halifax is indicative of great age, but certainly nothing like 2,000 years.

"This stretch of roadway does not branch from the modern Blackstone Edge Road at the 'White House,' but lies on the open moor about $\frac{1}{4}$ mile to the east of that noted hostelry. The old track leaves the new road at the 'Rake Inn' below 'Windy Bank,' near

Littleborough. And again this particular length of causeway does not rejoin the modern highway at 'Bailings Gate,' but crosses it at Baitings Gate. As for the entire length being paved by the original gritstones laid by Roman Legions with masoned stones, these are all gratuitous assumptions and wishful thinking, which follow the first presumption of a Roman origin on a supposed highway from Manchester to York by this route, instead of by Castleshaw, where a Roman camp was actually explored years ago.

"No fewer than a dozen different theories have been put forward to explain the singular manner in which the central trough stones are grooved—well shown in the photograph—but nothing has been generally considered feasible except perhaps some form of skidding, and even then it need not be of Roman origin. At the crest of the hill there is an open area, but no traces of a courtyard to a military post of anything like Roman date of construction. (You may know that Col. Roseworm had troops on the Blackstone Edge in the Commonwealth period). The so-called stone-bridge is nothing but a restored culvert about 3 ft. high to cross the shallow mountain stream flowing down Black Castle Clough, where the old pack horse road crossed it, and the so-called 'Roman' road.

"I may add that I am aware of most, if not all, the matter which has been published on this interesting and unique stretch of roadway in my native district Rochdale, and have not made the statements without due reasoning and forethought."

Suggestions Section

By "Spanner"

(662) Screw Operated Band Brake ("Spanner")

This is an efficient and easily constructed brake that can be used in many different kinds of Meccano models. Rotation of the handwheel 1 causes a Threaded Boss 2 to travel in either direction along the Threaded Rod 3, thus reducing or increasing the grip of the Cord 4 passed around the Pulley 5, which is fixed on the driven shaft 6.

An advantage of this brake is that the speed of rotation of the shaft 6 may be varied as required, or the pressure of the Cord altered to meet different loads. The grip of the Cord about the Pulley cannot vary when once set unless the handwheel 1 is turned.

The brake drum 5, a $1\frac{1}{2}$ " Pulley, is mounted on the driven shaft 6, preferably by two set screws, to prevent it from slipping when under full braking strain. The Cord 4 is held in place at one end by a Bolt and Nut 7, and passes around the brake drum, the other end being secured to the Threaded Boss 2.

If greater pressures than the Cord can withstand are anticipated the $1\frac{1}{2}$ " Pulley may be replaced by a built-up Pulley consisting of two Flanged Wheels placed face to face, or a Wheel Flange and two Face Plates bolted securely together. A built-up Pulley of this type will permit the use of thicker and stronger cord.

(663) The Construction of Cams (A. Bradbury, London S.W.15)

A cam can often be used in mechanisms to perform functions that otherwise would require much more complicated arrangements. There are various methods by which suitable cams can be constructed, and suggestions put forward for this purpose by A. Bradbury are as follows. The first is an adjustable cam, the operation of which can be altered within limits as desired. For this he uses a Bush Wheel

to which a Pawl is rigidly secured with its boss outermost. As the cam so formed rotates, the tappet rod it operates is raised by the Pawl and drops suddenly when it reaches the end of the Pawl. The speed of the upward movement of the tappet can be varied by altering the position of the Pawl in relation to the cam. The second is a symmetrical cam made by bolting two Pawls in place, one being arranged on each side of the Bush Wheel so that their ends come together.

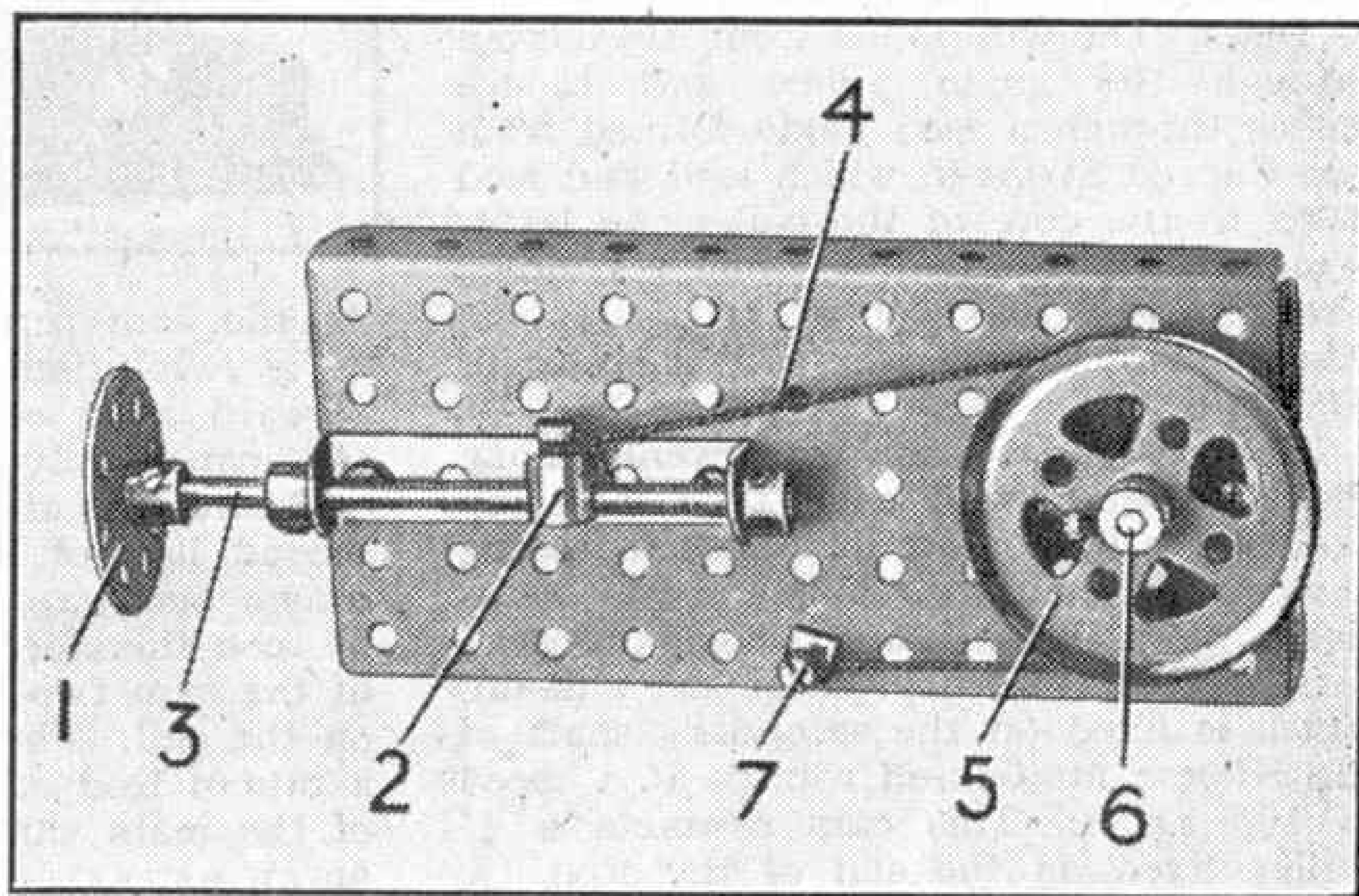


Fig. 662.

(664) To Prevent Belts Slipping ("Spanner")

When using a piece of cord to form a belt drive between two pulleys the cord often becomes slack and tends to slip round the pulleys. A very simple remedy for this is to sprinkle a little powdered resin on the cord. This method will often be found very satisfactory, but in more obstinate cases a better and more nearly permanent cure is effected by connecting the ends of the cord by means of a short piece of elastic or Spring Cord, which will keep the cord always taut. Of course for only short belt drives, and where light power is required, the ideal method is to replace the cord belt entirely by a belt of Spring Cord or a Driving Band.

(665) A Long-Handled Meccano Spanner (R. Black, Swansea)

A simple idea for a Meccano Spanner attachment which should prove useful

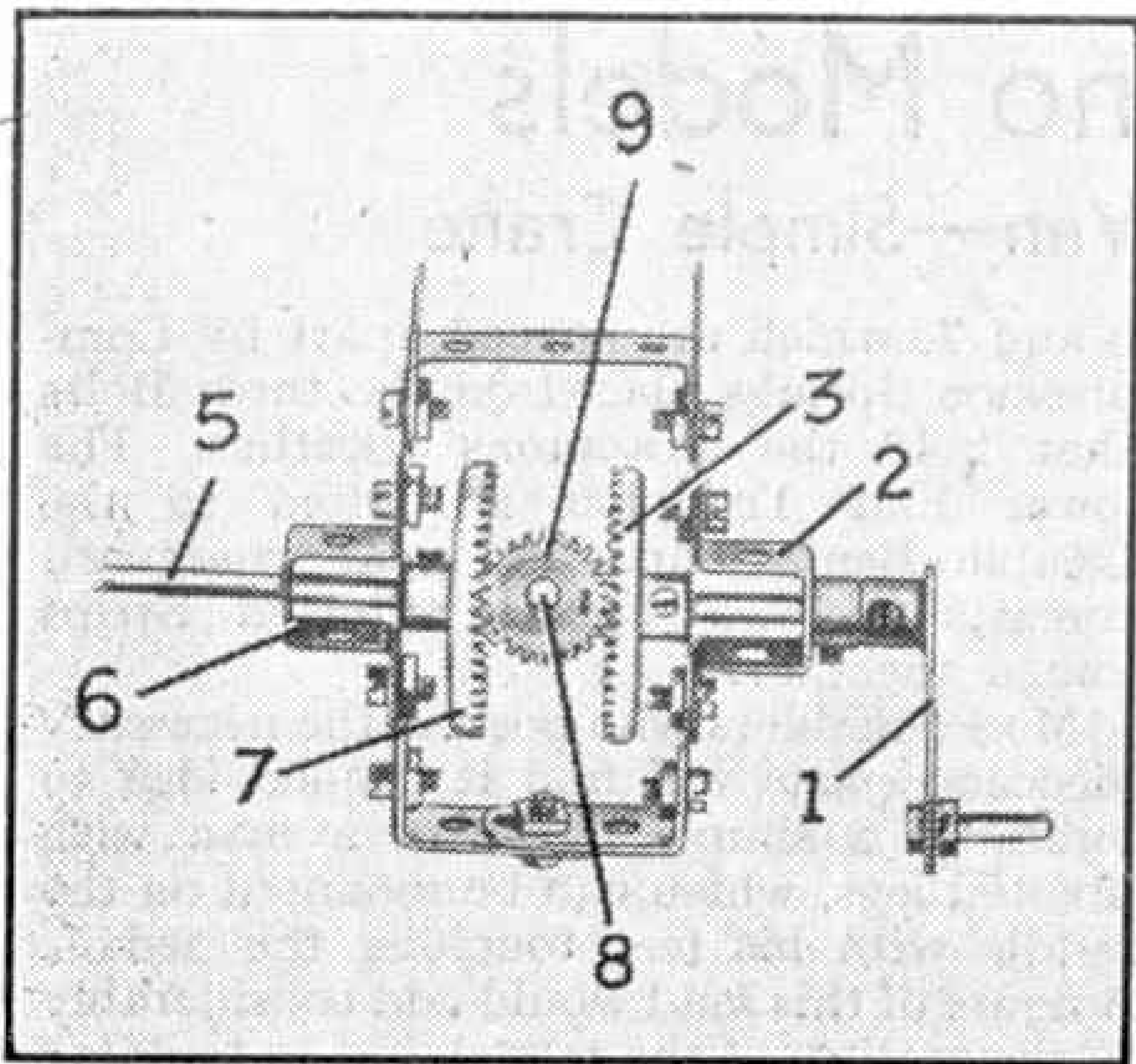


Fig. 666.

when constructing intricate models is suggested by R. Black, Swansea. An ordinary Meccano Spanner is secured by means of nuts and bolts to a Spring of any desired length, washers being placed on the bolts to secure a good solid fixture. The long handle thus formed will be very handy when the Spanner has to be inserted into the interior of a model to reach nuts in awkward places.

(666) Epicyclic Transmission Gear ("Spanner")

The interesting device shown in Fig. 666 has been described in the "M.M." previously, but several readers who did not see the issue concerned have written to ask for details of it. I am therefore repeating the description for the benefit of these enquirers and of others who missed the earlier issue.

The device is designed to provide a gear ratio of 2.1 between two shafts mounted in line with one another, and its chief merit lies in its compactness. The handle 1 is secured to a 2" Axle Rod journaled in bearings 2. This Rod is free to rotate in the boss of a 1½" Contrate Wheel 3, but is secured in one end of a Coupling. A further Rod 5, which runs freely in the other end of the Coupling, and is journaled in further reinforced bearings 6, carries the 1½" Contrate Wheel 7 fixed in the position shown.

A 1½" Rod 8 gripped in the central transverse hole of the Coupling carries a ¾" Pinion 9, which is free to rotate on the Rod, but is retained in position by a Collar. The Pinion is engaged

by the teeth of both Contrate Wheels 3 and 7. The Double Bent Strip forming the bearing 2 for the driving Rod is bolted to the plate by two ½" Bolts, the shanks of which enter holes in the Contrate Wheel 3 and so prevent it from rotating.

(667) Compact Reversing Gear ("Spanner")

In Fig. 667 three ⅞" Bevels are used to form a simple and compact reversing mechanism. The driving power is applied to the shaft 2 and is directed by means of the ½" diameter ½" wide Pinion 3 to the Gear Wheel 4, which is secured to the Rod 6 that carries two Bevel Gears 5. The reverse motion is brought into action by a hand lever 7, connected to a rocking arm 8, that causes the Rod 6 to move longitudinally in its bearings by striking one of the Collars secured against the faces of the Bevels 5.

The direction of rotation of the driven Rod 10 is changed by bringing one or other of the Bevels 5 into engagement with the third Bevel, which is rigidly secured to the Rod 10.

(668) A Heavy Duty Bearing

A useful bearing for heavy loads can be made by bolting a "spider" from a Universal Coupling in a Double Bent Strip, spacing it centrally by means of Washers.

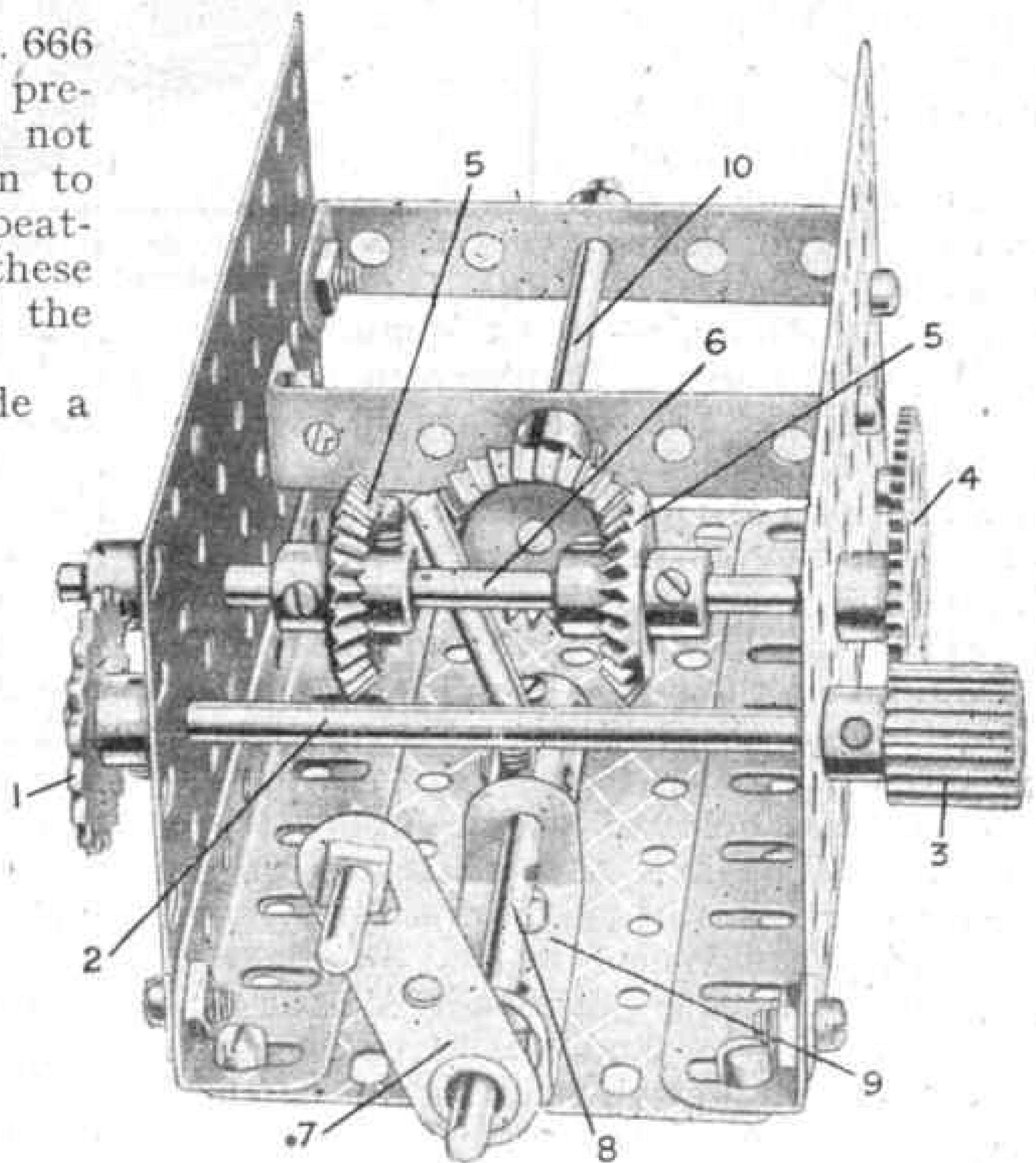


Fig. 667.

New Meccano Models

Tradesman's Delivery Van—Simple Crane

THE three-wheeler delivery van shown in Fig. 1 is a fine subject for model-builders who have a fairly large stock of Meccano Parts at their disposal, and it is quite simple in construction. Younger model-builders who possess only small Outfits will find the simple revolving crane shown in Fig. 2 within their scope. Although it is very easy to build, the crane works quite well.

The tradesman's van is built up in two main parts, the van itself and the rear portion consisting of the driving wheel, saddle and frame. The van is constructed mainly from Flat Plates bolted to Angle Girders at the corners, with a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate for the base. The lid is also a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flat Plate, fitted to one side by means of a Hinge. Suitable bearings for the front wheel axle can be formed in various ways, for example by bolting Flat Trunnions to the sides of the van, or by bolting a Double Angle Strip to the underside of the base. The headlights are $\frac{3}{4}"$ Contrates fixed to Flat Brackets, and the mudguards are Formed Slotted Strips attached to Angle Brackets. The wheels are 2" Pulleys shod with Rubber Tyres.

Two Strips 1 are pivoted to the underside of the van by bolting them to a Double Bracket. To these Strips are attached two $3\frac{1}{2}"$ Strips 2, which pivot on the crank Rod 3, and at their upper ends are joined by a Double Bent Strip. This Double Bracket carries also the two Strips 4, the lower end holes of which support the rear axle. The axle also passes through the rear end holes of the Strips 1.

A 1" Sprocket Wheel on Rod 3 is linked by chain with a $\frac{3}{4}"$ Sprocket Wheel on the rear axle. The Rod 3 is fitted at each end with a Crank, and each Crank carries a Threaded Pin 5 that forms one of the pedals.

The saddle consists of Flat Trunnions

6 and 7, which are spaced apart by Compression Springs placed on the three Bolts that hold the Trunnions together. The lower Flat Trunnion is bolted to the Double Bent Strip. The rear mudguard consists of two Formed Slotted Strips joined together.

Model-builders who possess the necessary Meccano parts will find it a good idea to build up a simple figure of a man with pivoted legs, which can be mounted on the saddle with his feet touching the pedals. A figure of this kind would add considerably to the realism of the model, but in building

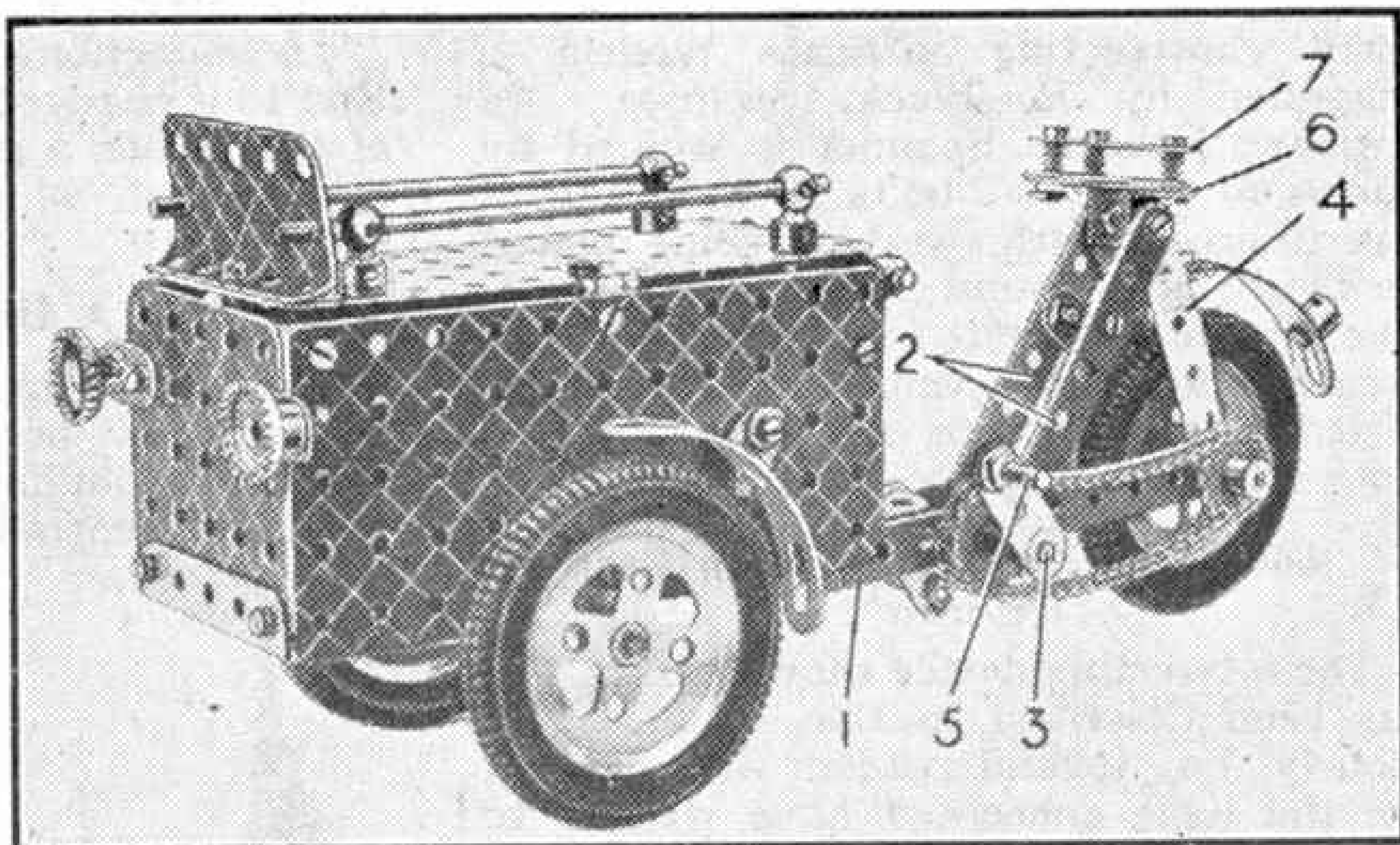


Fig. 1. A fine delivery van that runs well and is easy to build. It can easily be fitted with a rider whose legs move realistically.

it care should be taken to ensure that its proportions are in keeping with the general scale of the van. The legs should be formed from Strips, and must be locknuted to the body so that they are quite free to pivot or move as the pedals rotate.

Model-builders who do not possess all the particular parts specified will find it possible by the exercise of a little ingenuity to use other parts in constructing the model. For example, instead of hinging the lid of the van to the body a Hinged Flat Plate could be used to form both the one side and the hinged lid. Similar variations in other parts of the construction will readily suggest themselves to a keen model-builder.

Parts required to build model Tradesman's Delivery Van: 2 of No. 2; 2 of No. 3; 2 of No. 4; 4 of No. 9d; 1 of No. 9f; 3 of No. 11; 4 of No. 12; 2 of No. 15; 1 of No. 16; 2 of No. 16a; 2 of No. 17; 3 of No. 20a; 2 of No. 29; 43 of No. 37a; 39 of No. 37b; 6 of No. 38; 1 of No. 45; 1 of No. 52; 1 of No. 59; 2 of No. 62;

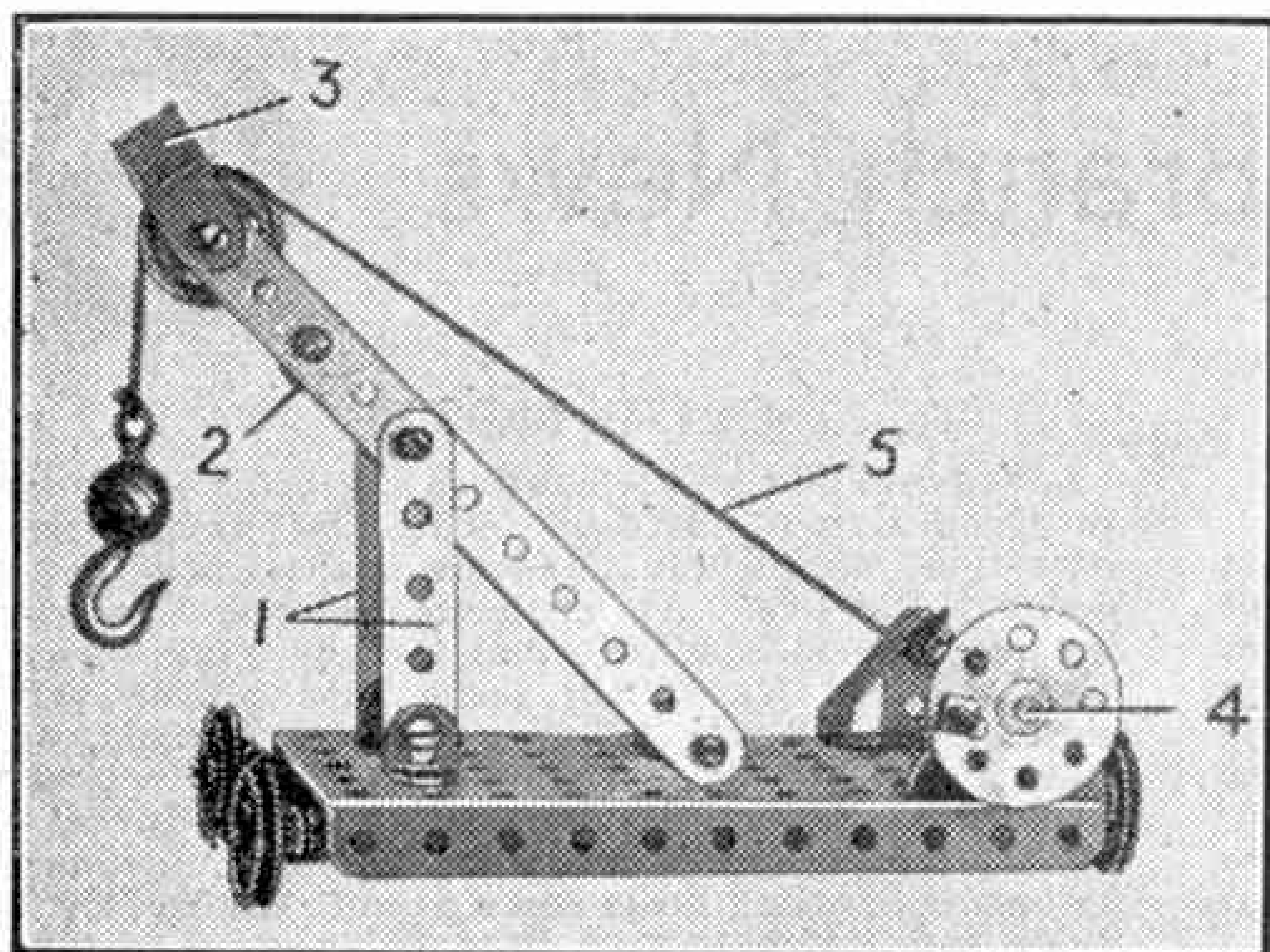


Fig. 2. A simple working crane that requires only a few parts.

1 of No. 64; 3 of No. 70; 2 of No. 72; 1 of No. 94; 1 of No. 96; 1 of No. 96a; 4 of No. 111a; 1 of No. 114; 2 of No. 115; 3 of No. 120b; 3 of No. 126a; 1 of No. 133a; 4 of No. 136a; 3 of No. 142a; 1 of No. 188; 4 of No. 215.

The base of the simple revolving crane shown in Fig. 2 is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, which is fitted with two wheels at the front end and a single wheel, placed centrally, at the rear end. The wheels are 1" Pulleys mounted freely on $\frac{3}{4}''$ Bolts

locked firmly by two Nuts to the Plate.

The jib is formed from two $5\frac{1}{2}''$ Strips attached at their lower ends by means of Angle Brackets to the Flanged Plate. Two $2\frac{1}{2}''$ Strips 1, also bolted to Angle Brackets on the base, are attached at their upper ends to the $5\frac{1}{2}''$ Strips as shown. Bolted in the third hole from the upper ends of the $5\frac{1}{2}''$ Strips is a Double Bracket 2. A 1" loose Pulley is held on a $\frac{3}{4}''$ Bolt at the head of the jib and this Bolt holds also a Cranked Bent Strip 3.

The winding Rod 4 is $4\frac{1}{2}''$ long and is mounted in two Trunnions bolted to the Flanged Plate. The Rod is fitted with a Bush Wheel and this is given a handle formed by a Threaded Pin secured in one of its holes.

A piece of Cord 5 is attached to a Cord Anchoring Spring on Rod 4, and then is passed over the jib-head pulley and tied to a Loaded Hook or a Crank Hook (Part No. 57).

Parts required to build model Revolving Crane: 2 of No. 2; 2 of No. 5; 1 of No. 11; 4 of No. 12; 3 of No. 22; 1 of No. 22a; 1 of No. 24; 17 of No. 37a; 14 of No. 37b; 1 of No. 44; 1 of No. 52; 1 of No. 57b; 3 of No. 111; 1 of No. 115; 2 of No. 126.

Model-Building Competition By "Spanner"

Can You Make a Meccano Toy?

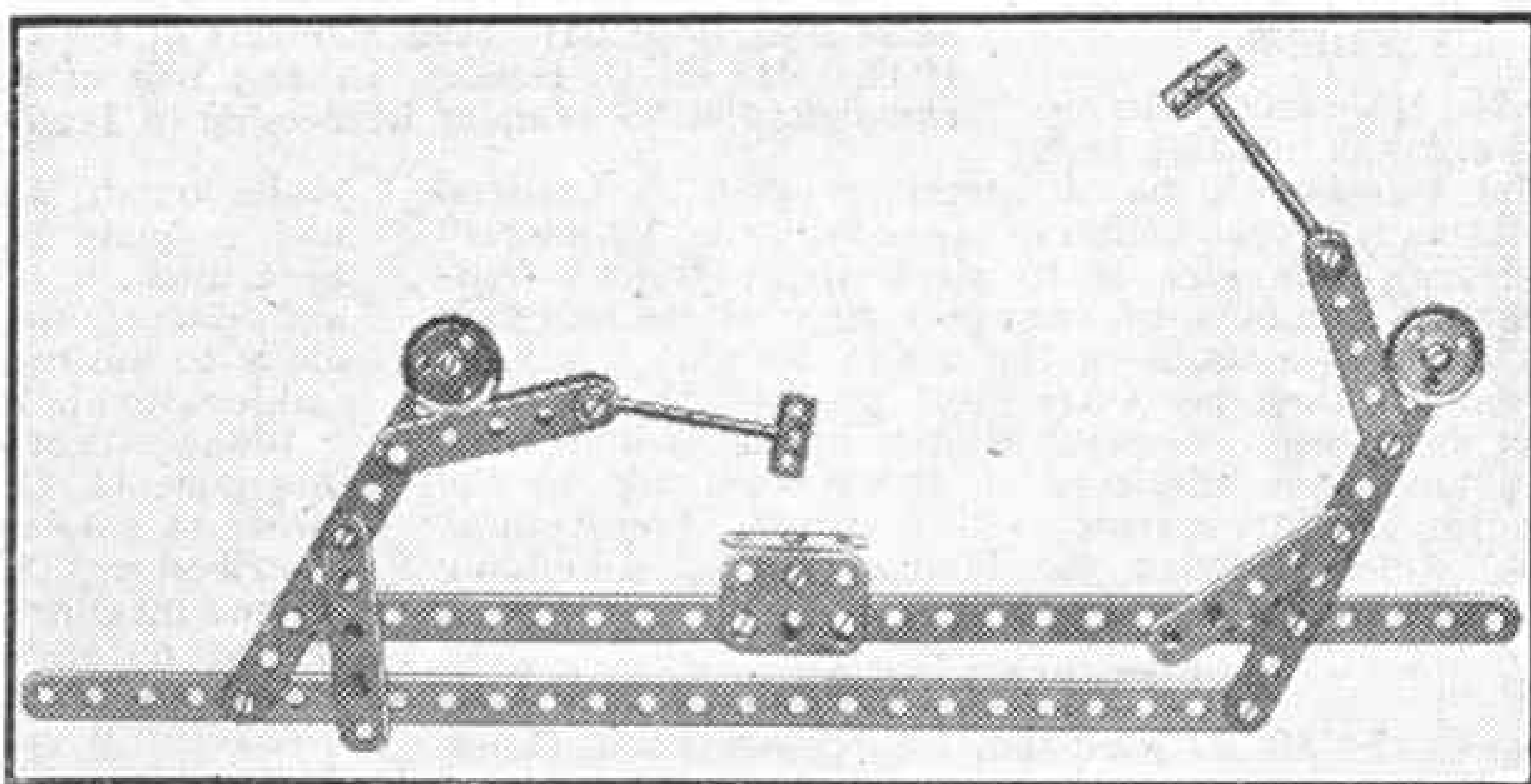
There are hundreds of simple mechanical toys suitable for amusing young children that can readily be built up from a few Meccano Parts. One example of such toys is shown in the illustration on this page. This consists of two figures that represent blacksmiths, and by pulling and pushing on the ends of the Strips to which the figures are pivoted they can be made to swing their hammers so that they strike the anvil turn and turn about. A simple toy of this type will give lots of pleasure to a tiny tot, and in these days, when ordinary toys are so scarce, a gift of this kind will be very welcome.

In order to encourage Meccano model-builders to experiment in making toys with their Outfits we are offering a number of prizes for the most humorous and ingenious efforts of this kind submitted to us. Every owner of a Meccano Outfit may send in an entry, no matter what his or her age may be, and there are no entry forms to fill in or fees to pay.

It should be clearly borne in mind that models must be built entirely from Meccano Parts and all toys submitted must be workable. A suitable entry, for instance, might consist of two boxers with pivoted arms and legs attached to strings, so that by pulling the strings the figures could be made to fight each other in a realistic manner. Another idea would be a human face, the eyes, mouth and ears of which could be made to move, so as to convey the idea that the

owner was in pain or laughing heartily.

The contest will be divided into two Sections, A, for competitors over 14 years of age; B, for competitors under 14 years of age, and the prizes to be awarded in each for the best toys submitted are as follows: First Prize, Cheque for £2/2/-; Second Prize, P.O. for



These Meccano blacksmiths work harmoniously together each in turn striking the work on the anvil as Strips connected to them are pushed and pulled. Fine prizes are waiting for builders of other working toys in Meccano.

£1/1/-; Third Prize, P.O. for 10/6. There will also be Consolation Prizes of 5/- each. The competitor's age, name and address must be written on each entry, and this should be addressed to "Meccano Toy Contest, Meccano Ltd., Binns Road, Liverpool 13." Closing date: 30th December.



Club and Branch News



WITH THE SECRETARY

NEWS FROM WEST AUSTRALIA

I am often surprised by the intensity of the interest and enthusiasm displayed, in the most difficult situations, both by those associated with Clubs now active and by former officials and members who are in the Services, or for some other reason are a long way from their old haunts. An excellent example has just reached me from Australia. Mr. V. Malmgreen, in days of peace the enterprising and active Leader of the Maylands (Perth) M.C., has just spent a short leave at home. Most of his time he devoted to his Club, and he has written to tell me of his pleasant surprise when he discovered the old enthusiasm still in evidence and plans being made for an interesting year's work ahead.

There is much food for thought in this. The Club continues its work with undiminished zeal, for the simple reason that Mr. Malmgreen always trained his members to accept responsibility, and found his best officials among those who had grown up as members of the Club. Only in this way is real continuity to be attained, and the present position at Maylands is a tribute to the skill and energy with which Mr. Malmgreen and his officials and members put their scheme into operation.

A MODEL-BUILDING SCHEME

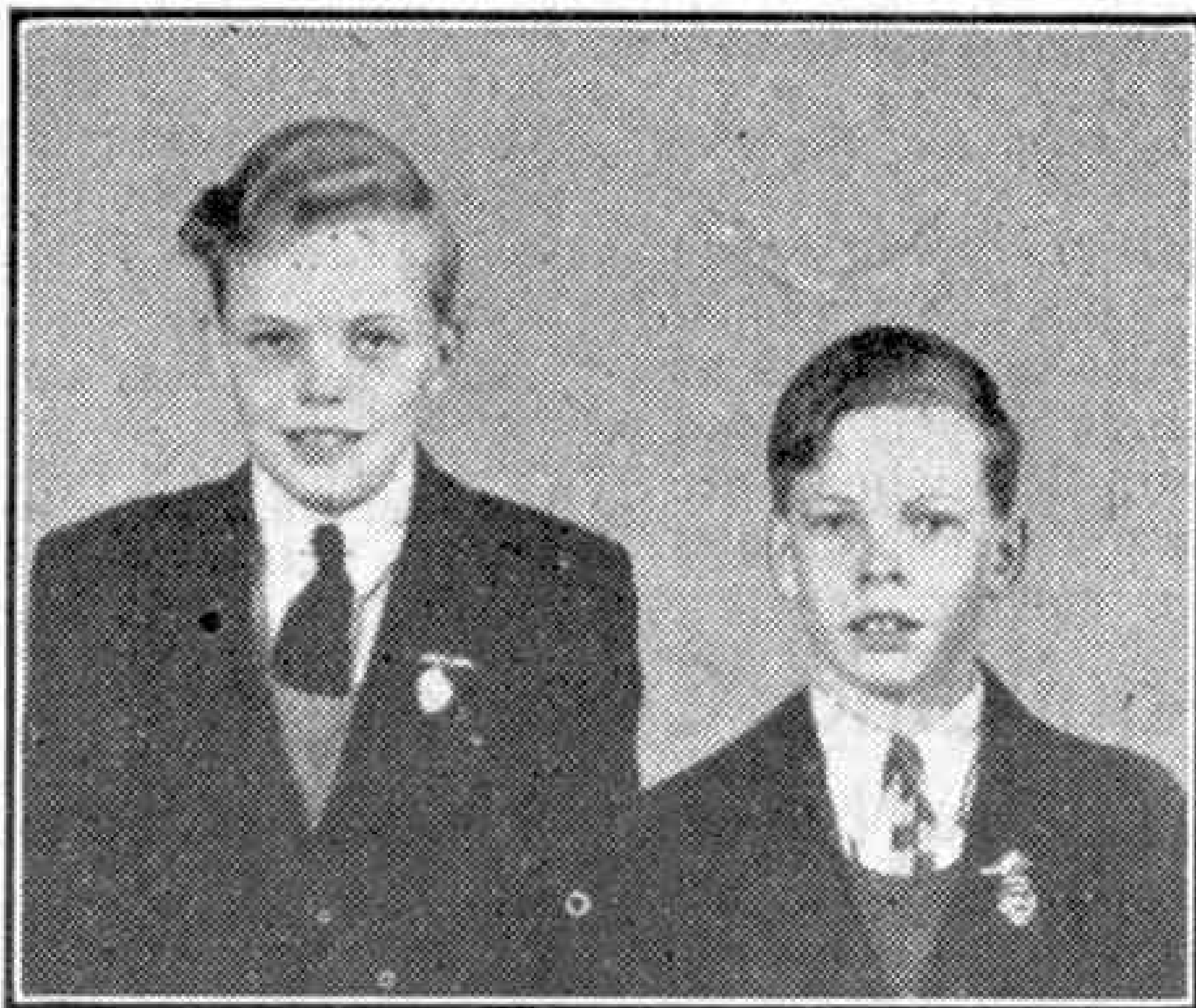
Mr. Malmgreen tells me of a model-building idea that I think will be of interest to all Club Leaders. This is the construction of a model of a "Lancaster" factory. The idea is to show these famous four-engined bombers in various stages of construction in different sections of the works, so that it can be seen how their parts are built up and the machines are assembled. Working models of lathes and other machine tools employed in the process add to the realism of the scheme, which should suggest ideas to Leaders looking for interesting model-building schemes for the winter months.

PROPOSED CLUBS

GLASGOW—Mr. I. Johnston, 101, Dixon Road, Crosshill, Glasgow S.2.
SHEFFIELD—Mr. N. Hancock, 87, Onslow Road, Ecclesall, Sheffield 11.
HITCHIN—Mr. R. Brazier, 140, Bearton Road, Hitchin, Herts.

PROPOSED BRANCHES

HORLEY—Mr. Murray, "Glendalough," The Grove, Horley, Surrey.
BEDFORD—Mr. D. Roper, 88, Acacia Road, Bedford, Beds.
LARGS—Mr. G. Kidd, 22, Barr Crescent, Largs.



[A unique photograph showing two brothers who hold important official positions in the Exeter M.C., the Club roll of which is now 265. On the left is David Parker, President, and on the right Edward S. Parker, Secretary. Both have been members of the Club since 1939. Mr. M. C. Hodder, Leader, will celebrate the completion of 25 years of Leadership in January 1945.

CLUB NOTES

SOUTHPORT M.C.—Preparations are being made for an Exhibition of Meccano models, at which other attractions will include a Lecture, a short play and a Hornby Railway. At ordinary meetings, mostly devoted to model-building and Hornby Train operations, General Knowledge Tests have proved very successful. Club roll: 10. *Secretary:* M. Oldfield, 42, Palmaston Road, Southport.

CROSLAND LODGE (HUDDERSFIELD) M.C.—Interesting meetings have included Musical Evenings, Aeroplane Spotting Tests and a Social. Cricket, Cycle Rides and Rambles have been enjoyed. The Club Magazine is now to be published. A Junior Section

has been formed and is increasing its membership. Club roll: 19. *Secretary:* D. Graham, 19, Moorside Avenue, Crosland Moor, Huddersfield.

KESWICK M.C.—The second Annual Exhibition was held at High Chestnut Hill, by kind permission of Col. Morton, President. Meccano cranes, bridges, lorries and cars were on view, and other models were shown in the Club Headquarters, which were open to visitors. The proceeds amounted to £7/5/- and were given to the Red Cross. Club roll: 6. *Secretary:* J. Lees, Woodside, Chestnut Hill, Keswick.

BRANCH NEWS

WATERLOO (DUBLIN)—New timetables for use on the Branch Railway were introduced and modified during the Summer. Some locomotives are

under repair, and the Rail Car has been overhauled and is again in service. Slight improvements have been made to the layout, which represents the Kent and East Sussex Railway, and additions are being made to the rolling stock. *Secretary:* S. B. Carse, 38, Oakley Road, Ranelagh, Dublin.

WOOD GREEN—The Chairman of this recently incorporated Branch is Mr. F. G. Appleton, the owner of a splendid miniature railway that has been described and illustrated in the "M.M." Mr. Appleton invited members to inspect his layout, on which they carried out interesting operations. Various layouts have been designed and operated at Branch meetings. *Secretary:* M. J. Gilbert, 439, Lordship Lane, Wood Green, London N.22.

BANBURY—Outdoor track meetings and model yacht races have been the chief items in the programme so far. In addition chemical experiments have been carried out and the Model-building Section is busy with constructional work for a Meccano Fairground. *Secretary:* D. J. Hopkins, 348, Warwick Road, Banbury, Oxon.

WAVERLEY (SALFORD)—Has now been incorporated. An excellent track has been laid and tested, with bridges across doorways and windows. *Secretary:* P. Barlow, Waverley Hotel, Eccles, New Road, Salford 5.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A VIEW FROM SNOWDON

I was interested by the article on the Snowdon Mountain Railway that appeared in the "M.M." for June last, particularly in the comment that from the summit of the mountain marvellous pictures of land, sea, lake and mountain are revealed when rolling clouds open from time to time. The accompanying photograph illustrates one of these aspects. It shows a train standing in Summit Station, the highest in Great Britain, and beyond it can be seen valleys and heights, with lakes, the whole forming a splendid panorama.

R. RAWLINSON
(Whaley Bridge)

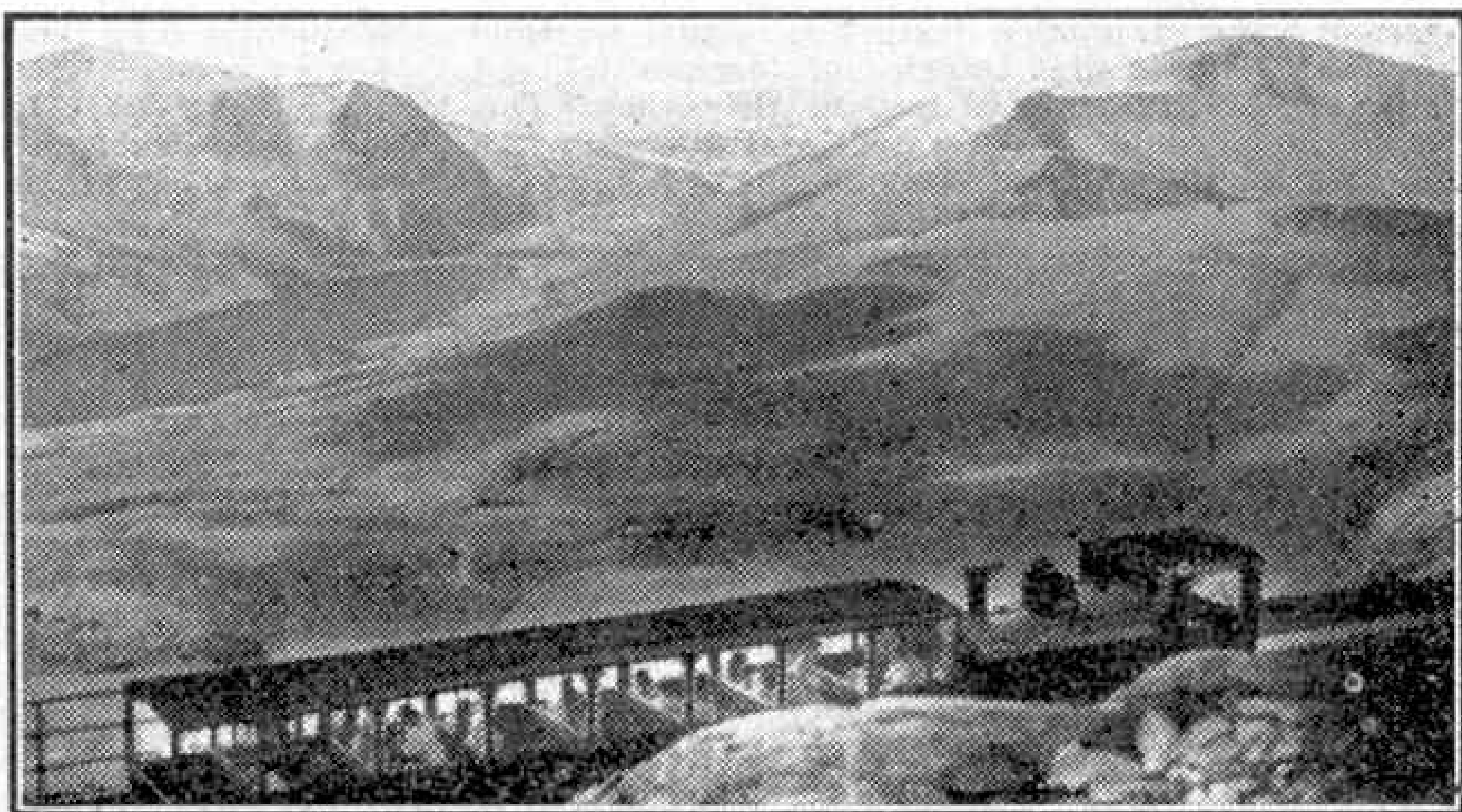
LONDON'S STRANGEST HOUSES

"The camera never lies," is a very common expression, but if you take a look at the accompanying illustration, the lower one on the page, you will see just how untrue it is. Examine the picture of two apparently normal houses very closely and you will notice that they have no chimneys; the windows do not contain glass, but painted bricks. Altogether these two houses are different from their staid Victorian neighbours, but even if you walked down Leinster Gardens, Bayswater, you would probably pass them without noticing anything strange, for they are well camouflaged. Besides the features I have mentioned, there are other points in which these buildings differ from the dwellings on each side. The rest of the houses have basements, but those pictured here, Numbers 23 and 24, merely have a flagged space where their basement windows should be, and if you wished to enter Number 24 you would look in vain for a door knob.

What is the reason for the lack of signs of life in London's strangest houses? I found the answer to this question as I stood in Leinster Gardens one sunny morning. Suddenly the ground shook, and below me I heard an angry rumbling sound. Yes, the trains of the London Underground run beneath Numbers 23 and 24, and these "houses" are nothing more than facades. If you could step through one of their dusty front doors you would fall to the electric line below! When the Metropolitan Line was driven through this part of London, these houses

were demolished, and in order not to leave an ugly gap in the Victorian terrace, the front walls were spared and their appearance left as normal as possible.

Should you wish to prove to yourself that all is not as it appears, take a walk into Porchester Gardens, and perhaps you will see a tube train running through



A train of the Snowdon Mountain Railway in Summit Station. Photograph by R. Rawlinson, Whaley Bridge.

the erstwhile foundations of Numbers 23 and 24, Leinster Gardens. D. W. DODDS (Middlesbrough).

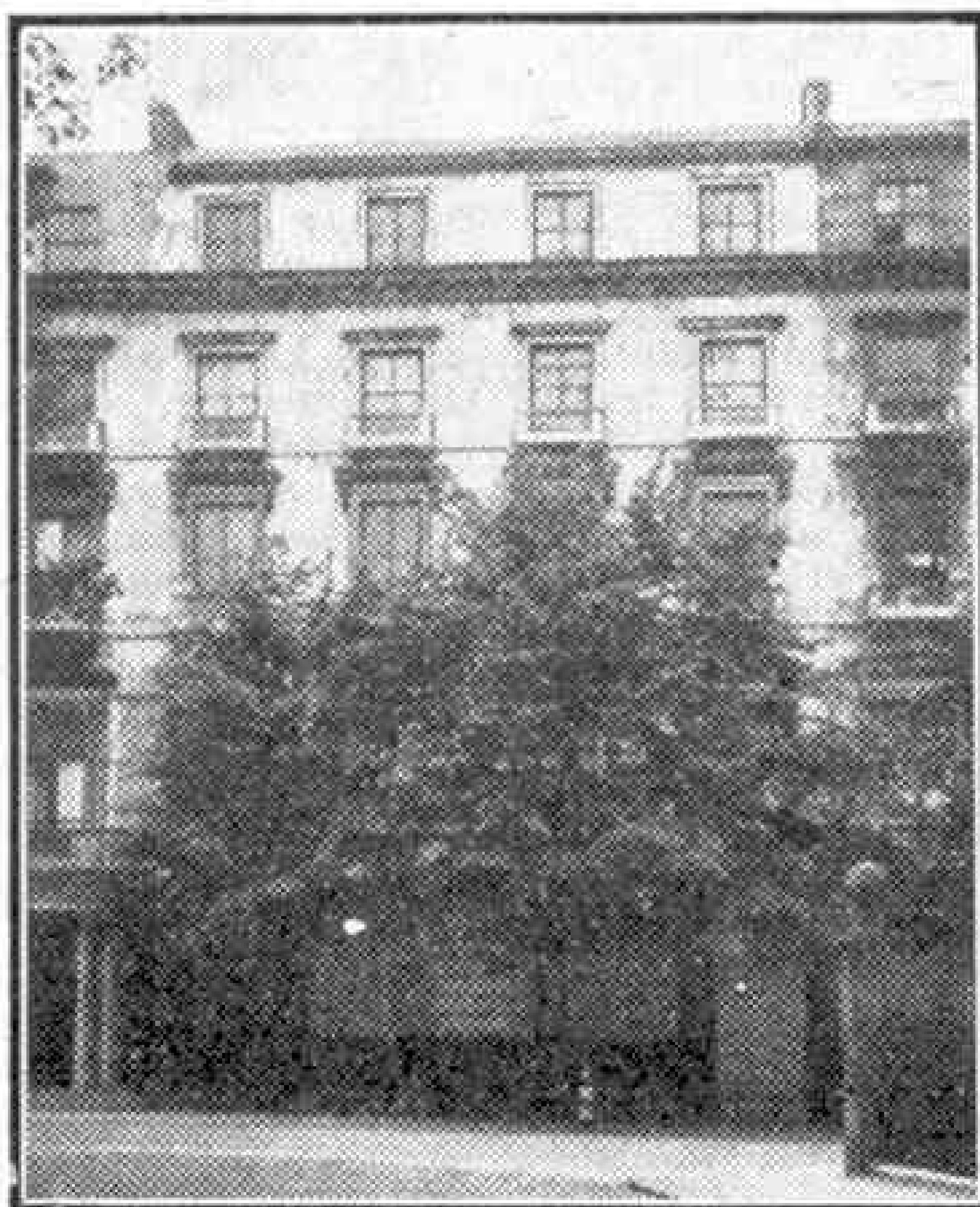
MY HOBBY

Often I have read of such strange hobbies as that of collecting tram-tickets, bottles and match-box covers, and I used to wonder what should I do in my spare time. About two years ago, when I was reading "The Prisoner of Zenda," I thought that here was my hobby! I would have an imaginary country of my own!

Thus the state of Marlboro, "somewhere in the Atlantic," was created, and it has given me great enjoyment during my leisure hours. I traced its political life from about 1700 down to the present day and have written all I can possibly think of about it in a large book. I fear that Marlboro is a good deal too pugnacious for most Britons, for during the 200 "years" of its existence it has had no less than six revolutions, four wars and five civil wars, and has had two sovereigns assassinated!

In 1940 it was declared a republic after a revolution, and now President Martin is firmly established and the country, with two neighbours peacefully absorbed, is divided into 20 federated states.

N. PEARSON (East Stanley).



Nos. 23 and 24, Leinster Gardens, Bayswater, "houses" that have nothing behind their front walls. Photograph by D. W. Dodds, Middlesbrough.

Fun with your Hornby Trains

Reproducing Wartime Conditions

WITH the continued impossibility under wartime conditions of obtaining fresh material for their miniature railway systems, Hornby owners have been compelled to "make do" to a considerable extent in order to maintain the interest of their layouts. The adaptation of accessories of various kinds from this and that is quite good fun, however, and the reproduction of wartime traffic introduces a certain amount of novelty into operations.

We have in previous articles from time to time made suggestions on these lines. From the working point of view, a notable feature in actual wartime practice has been the transfer of locomotives and rolling stock from one system to the other. This has given splendid opportunities to those who like to mix their engines and coaches and is a specially

the train can vary in miniature if we are short of stock for in addition to the normal ward cars the real trains usually include living quarters for the staff provided for by more or less standard vehicles. Whichever way we carry out our scheme the running of such a train will be interesting and topical.

Many curious and unusual routes are taken by ambulance trains so that the arrangement of the journey of our miniature trains can provide plenty of fun. Here again which company's stock is used does not matter and engine workings on such duties frequently take the locomotives well off their normal beaten tracks.

Amongst other traffic of special military interest are troop trains, which frequently have to be run at very short notice and which almost as frequently

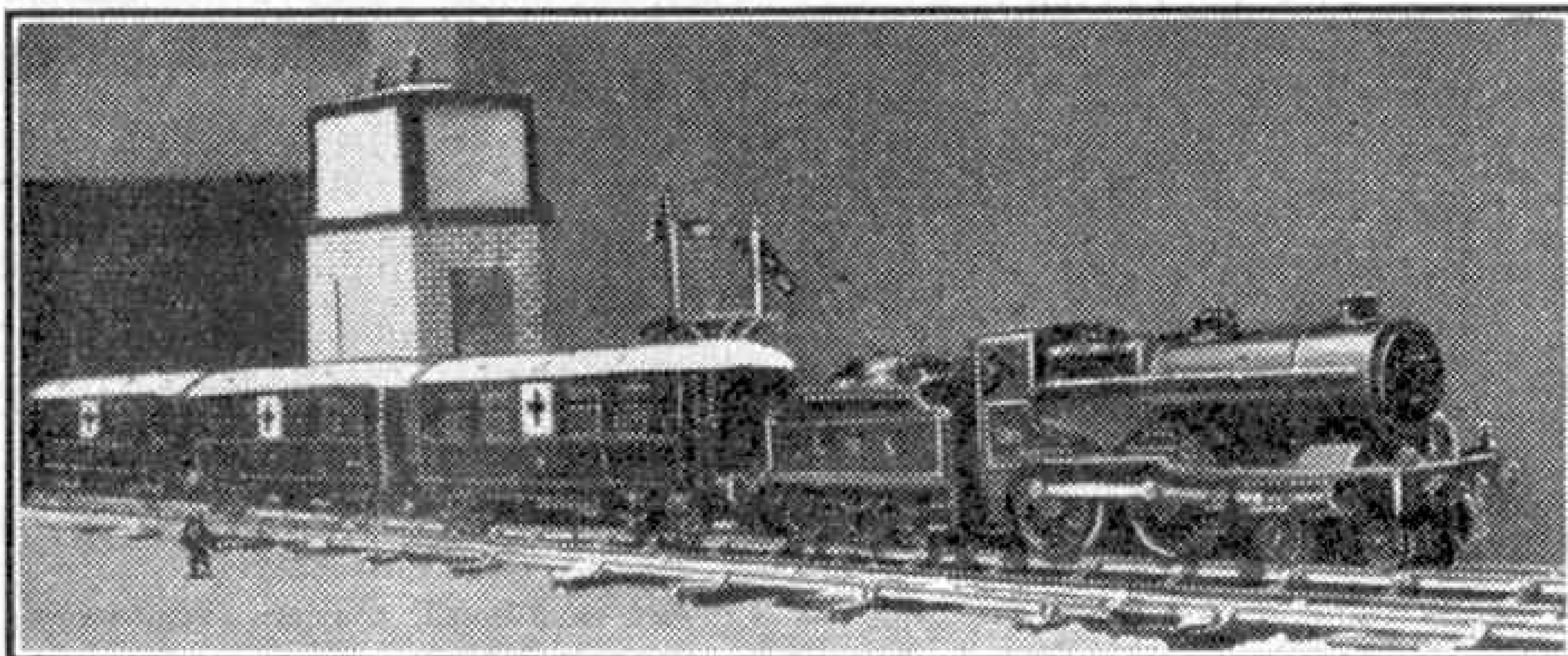
have their running altered in some detail at the last moment. The "working in" of specials of this kind will be a grand chance for those who operate their miniature railways on a systematic or perhaps even a timetable basis.

A miniature troop special can be quite a composite train for we will suppose that in addition to the personnel, for whom we provide whatever passenger vehicles we may have available, we have to carry baggage, equipment and stores. Therefore if we use

No. 2 Saloons or maybe No. 2 Corridor Coaches for the main part of the train we shall require a Luggage Van or a Guard's Van for baggage; and possibly Flat Trucks or open Wagons for the tanks, guns or whatever appliances we have to move. Most households these days include one or two models of these items that can be used quite well to form a suitable load. They can be sheeted over with Hornby Wagon Tarpaulins, or we may prefer to leave them uncovered as they look very well travelling on a railway vehicle. It must be remembered that these suggestions are general in character and that variations in the make up of trains of this kind will have been observed by keen readers.

Supply trains are easy to arrange for they usually consist of covered vans of various kinds often pressed into use because of the urgent nature of the traffic. Therefore practically any of the Vans of the Hornby Series can be used for a miniature "Government Special." Our Refrigerator, Banana, Fish, Biscuit and other Vans can thus be used together in one train in a way that would never have occurred to us in normal times! In a similar manner we can round up our Tank Wagons, and perhaps those of one or two friends as well, in order to make up a "special" for petrol or oil traffic.

The illustration on this page includes an item besides the ambulance train that we have described. This is the realistic water tank, made at home with simple materials as a result of the scarcity of standard Accessories. Either wood or card can be used in the construction of a feature of this kind and it is sometimes possible to find a suitable tin to represent the tank section. In the model referred to, however, card was used and the top of the tank covered in, as large tanks often are.



A miniature ambulance train made up of No. 2 Saloon Coaches fitted up by J. L. Makin, Allestree, Derby. The water tank in the background is a home-made accessory and looks quite effective.

good excuse when several model railway owners combine their stock to make one big system. There are of course other items more directly connected with wartime operations and a particularly interesting example appears in the illustration on this page. This is a suggestion from one of our old readers, Mr. J. L. Makin, H.R.C. No. 30933, Allestree, near Derby, who has fitted up quite a realistic miniature ambulance train.

Such trains are unfortunate necessities of war and form in fact practically complete travelling hospitals. Sometimes they are built specially for the purpose but frequently it is possible to use standard vehicles that can be readily adapted. Our reader's train follows the latter practice for it is made up of three Hornby No. 2 Saloon Coaches, L.M.S. vehicles being used. The characteristic identification markings on the sides of the vehicles have been carried out by inking or painting a red cross on a square background of thick white paper, or thin card, and then securing each square by gumming it over the centre window of the coach. A similar scheme can be adopted for placing the markings on the roof as is often done. For a more permanent job of course painting direct on to the bodywork or roof of the coaches can be carried out but this is likely to create difficulties when the coaches are required again for ordinary use. With the "labelling" scheme a moist cloth will soon remove the markings when it is required to do so.

Other standard vehicles of the Hornby Series can be used equally well. In actual practice parcels and passenger brake vans have often been used, these being usually of "coachbuilt" construction. Therefore in addition to Saloon Coaches we could employ Pullmans perhaps and possibly the No. 2 Luggage Van and the No. 1 Guard's Van. The make up of

A Reader's Dublo Layout

ONE great advantage of a non-permanent miniature railway that is put away when not in use is that we can vary the layout plan according to the ideas of the moment. Provided that sufficient track material is available, many plans can be tried and the operations altered to suit. Often, however, we find that one particular type of system fits in best with our ideas, and we therefore adopt this frequently, though possibly with variations in detail to suit conditions of space or the operating schemes we have in mind.

Interesting views of a railway of this kind have been submitted by our reader J. Allan Patmore (H.R.C. No. 78171) of Wetherby, Yorks. One of these is reproduced on this page and the following details are based on the notes that

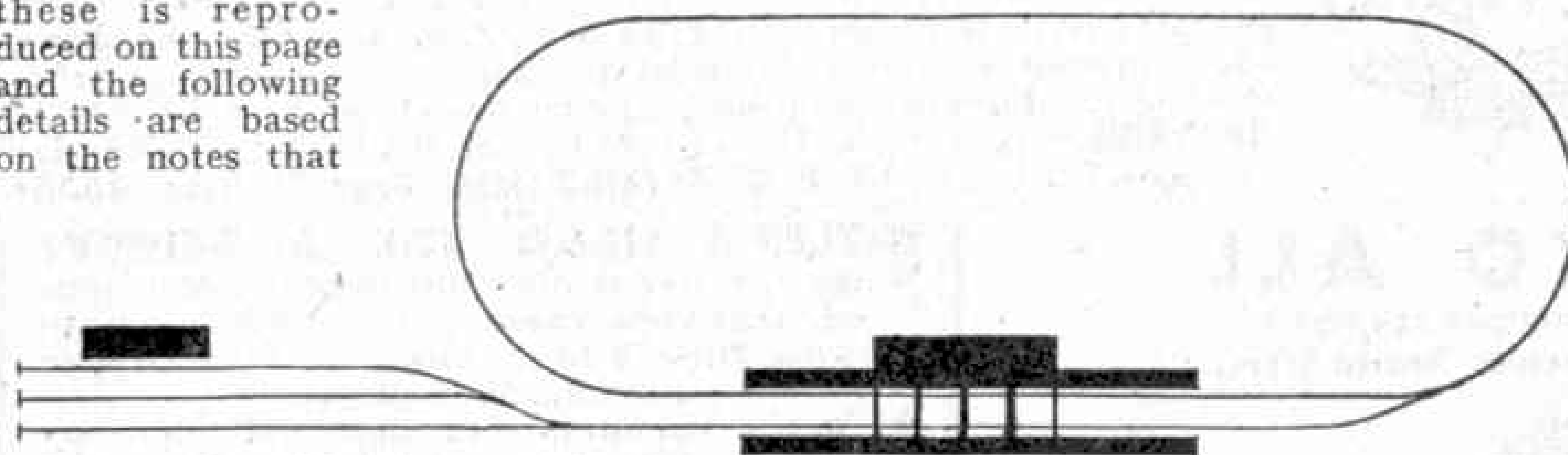


Diagram of the Hornby-Dublo layout of J. Allan Patmore, Wetherby, described on this page.

accompanied the photographs. The railway is laid with Hornby-Dublo electric rails and usually takes the form of an oval main line. Sometimes this is laid with double track throughout, using the standard radius curves for the inner track and the special larger radius curves for the outer track, so that both lines are kept parallel.

Unfortunately only three Points are available at the moment owing to present conditions, but even so plenty of variations in the arrangement of sidings are devised. In one typical scheme the oval main line is retained in order to afford continuous running but it is laid in single track on three of the four sides of the oval. Along the fourth side, where the main station is placed, there are two tracks. One of course is the continuous main line, while the other is brought off this by means of points and becomes parallel to it through the station platforms. While the main track curves away again beyond the station to form the continuous oval, the second track continues straight on and by means of the remaining two sets of points develops into three sidings. One of these serves a goods shed, and all three roads are terminated by buffer stops. Thus, while the station has two roads, one of them is in effect a terminal or dead-end road, the other being of course the through main line.

The main station is therefore a two-platform affair, and was made at home on similar lines to the Hornby-Dublo City Station. The main buildings and offices are at one side, and the platforms and tracks are spanned for part of their length by an arched roof. Other accessories of the building type include an engine shed, also a goods shed of the pattern that passes over the track, the loading platform being inside. In addition there are signal cabins, and at each end of the oval the single main line passes over a lattice girder bridge with curved top members.

Normally operations are based on L.N.E.R. practice, as the stock of that company predominates. There

are, however, both engines and stock of other lines, mostly L.M.S., but not all of these are of Hornby-Dublo manufacture. Through and joint working is therefore practised, so that there is plenty of variety in operations even though the track layout is necessarily simple. The L.N.E.R. coaching stock includes the standard Dublo vehicles, both of the articulated and the ordinary eight-wheeled types. These are used to make up a miniature "Flying Scotsman," which is one of the favourite services on the line and is usually very heavy. The usual engine for this is the Hornby-Dublo streamlined "Sir Nigel Gresley," which appears in the lower illustration. At times

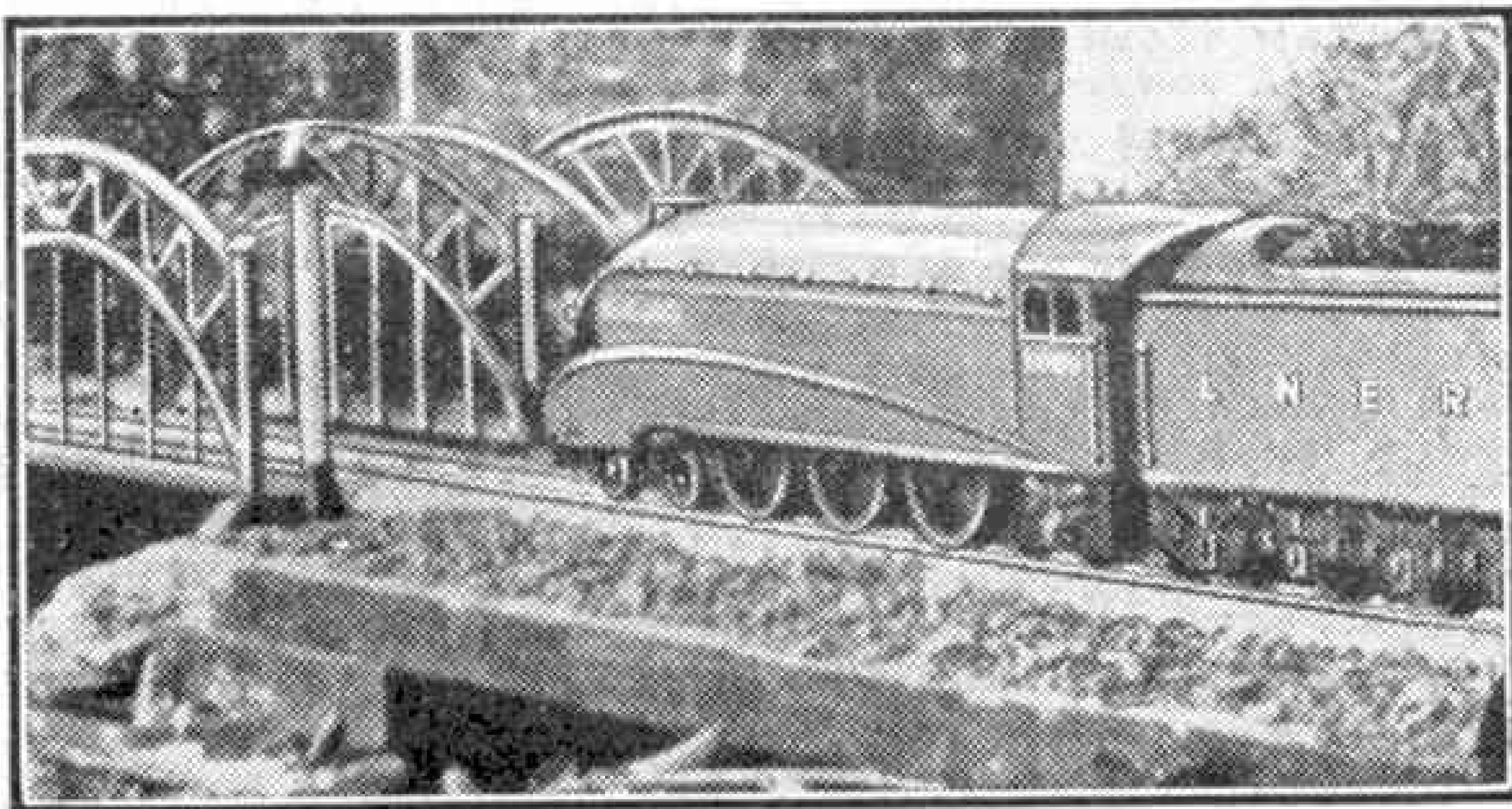
engine-changing operations are carried out in the course of the run, and then another 4-6-2 takes over; this, however, is of Continental type.

As the main line is continuous, the station has to represent different places as the trains make successive circuits of the track. This is quite a usual form of miniature railway licence, and one that we have often

taken advantage of in describing various working schemes. As only one train can run at once on a single-track continuous main line, not a great deal can be said against this practice. It is the only way to represent mileage in the restricted space to which most miniature railways are confined nowadays.

For intermediate and goods working there are two Hornby-Dublo 0-6-2 tanks, both L.N.E.R., these ably representing the "N2s" of actual practice. One of these engines is electric, but the other is clockwork, which makes it useful for short runs and for shunting movements on tracks on which there is already an electric locomotive. If a layout is not divided into separate electrical sections for this kind of work, a clockwork engine can be very handy. Coal and general traffic is dealt with in Hornby wagons both ordinary and high sided, so that goods trains do not have too "uniform" an appearance. An L.N.E.R. goods brake is provided.

Further passenger traffic is worked by a model railcar, and there is an L.M.S. 4-4-0 Compound and suitable coaches so that the station at times has quite a cosmopolitan appearance, which adds to the general attractiveness.

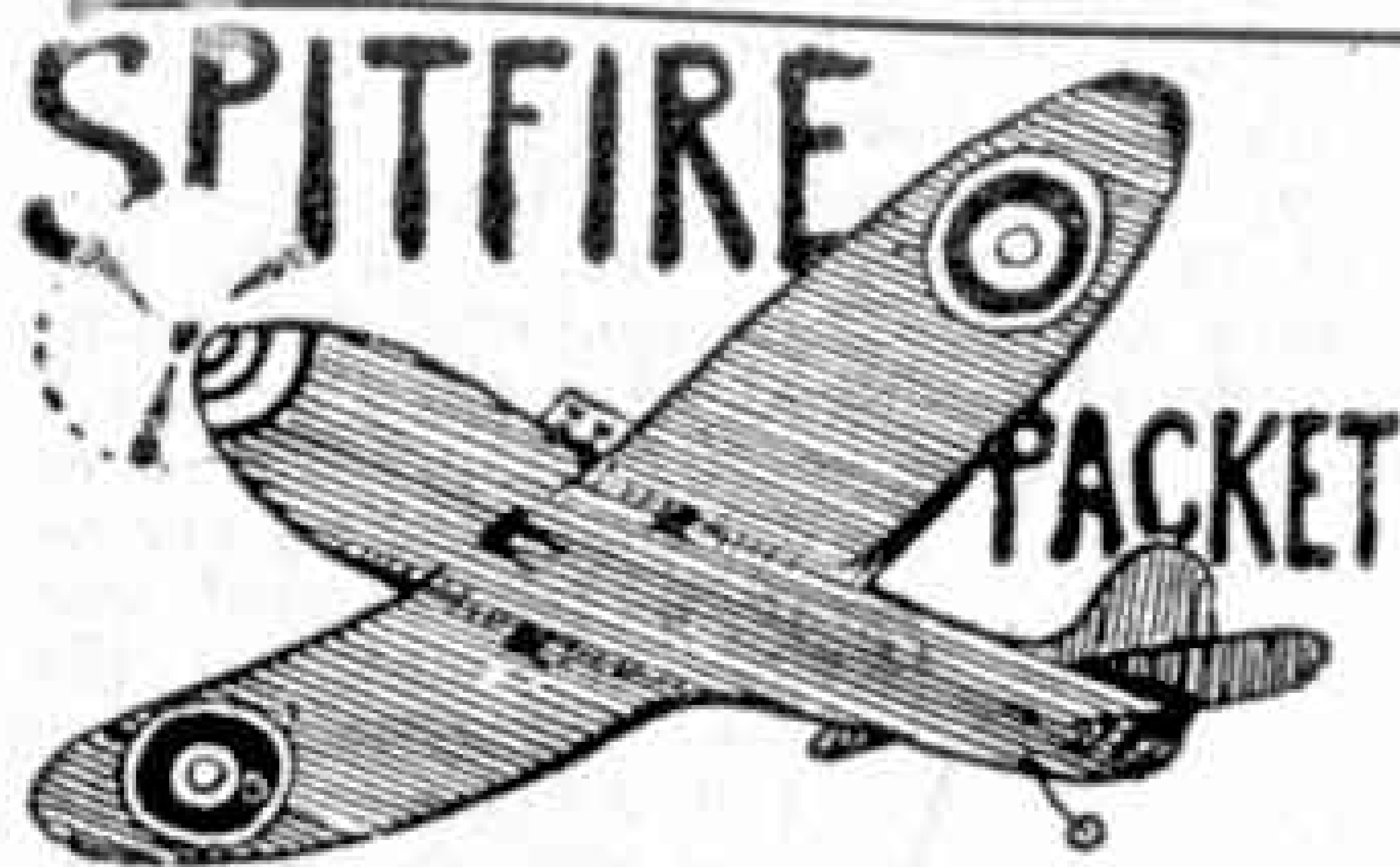


"Sir Nigel Gresley" on a heavy train approaching a girder bridge on the layout.

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Stamp Collecting

Posts and Stamps in India

By F. Riley, B.Sc.

IN our stamp tour of the British Empire we last touched on the Seychelles Islands. Crossing the Indian Ocean eastward from there we come to India itself, almost a continent rather than a country.

Posts organised by rulers of Indian states, with letters carried by relays of runners, can be traced back as early as the middle of the 14th century, and the East India Company continued the system when it gained control of most of India.

The stamp history of the country of course did not begin until nearly 100 years ago, and the manner of its origin is remarkable. In the district of Scinde the existing postal arrangements were in a very bad way about 1850, for the simple reason that the authorities had no money, the country then being in an impoverished state. The postmaster was a man of resource, however. He decided to introduce the stamp idea that had originated in Great Britain 12 years earlier, and had large quantities of $\frac{1}{4}$ anna stamps made and sent for sale to Government officials and stamp vendors. The postmaster then ordered that every police officer and collector of revenue should accept and forward, with his own official papers, all letters bearing the stamps, which of course were those of the East India Company. The result was a postal system that virtually cost nothing at all.

This first stamp was a round one with the words

"Scinde District Dak," dak or dak being the Hindustani word for post. It appeared in three colours, white, blue and scarlet, and was



embossed. Not many readers will be able to display specimens of this first Indian stamp in their albums, for they are scarce and highly priced; a used example of the white stamp would cost several pounds, and the scarlet one is catalogued at £100.

The stamp was a great success, and this was something of a revelation, for there were few who had believed it possible to introduce the pre-payment system of postage in India. The East India Company immediately took up the matter officially. The Scinde stamps were suppressed, after a life of only two years, and in their place

came $\frac{1}{4}$ a. stamps lithographed



in Calcutta, bearing the Queen's head. Then followed a series of stamps of similar design, varied by an eight-sided stamp, also a portrait issue, that appeared in several variations. All these are beyond the average young collector, especially the octagonal stamps, if these are cut square. No perforations were used and the stamps had to be cut from the sheet by means of scissors or a knife. Specimens cut square now have a very high value, but those cut out in the shape of the stamp itself are worth very little.

The stream of portrait stamps continued unbroken until 1929. The earliest, carrying the portrait of Queen Victoria, were the stamps of the East India Company, and more portraits followed when the Government assumed control of India, after the Mutiny. An interesting change came in 1877, when the Queen assumed the title of Empress of India, for the inscription on the stamp was then changed from "East India" to "India" simply. The series was continued with Edward VII and George V.

The great change in design came with an air stamp in which the portrait was relegated to a corner and the principal feature of the design was an imposing looking biplane flying over presumably Indian country. The appearance of this air stamp paved the way for the issue of some very interesting pictorials, all of which can be purchased at a reasonable rate, so that readers can fill up the Indian pages of their album and make an excellent show with very little trouble and expense. The inauguration of New Delhi in 1931 was the occasion of the issue of the first set. This was a handsome issue in six values, each in two colours, and their general appearance can be judged from the example illustrated on this page. This is the 1 a. value, which shows the Council House at the great new capital. In each case a portrait of King George V was included, and at the foot of the stamps were the words "Inauguration of New Delhi 1931."



More portrait stamps followed, and then came another occasion for the issue of a fine pictorial set, this time the Silver Jubilee. For this India produced its own stamps with a portrait of the King and a suitable inscription to mark the occasion, and for the pictorial part of the design typical Indian buildings and memorials were chosen. Like the former (Cont. on page 394)

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4d. ea. 55, 125, 178, 202, 228, 245, 350, 351, 426, D29, S7.

3d. ea. 57, 65, 69, 95, 107, 116, 161, 170, 190C, *192, 193C, 194, 198, 204, 211, 212, 219, 272, 274, 277, 313, 314, 315, 317, 318, 319, 320, 324, 326, 329, 334, 336, 337, 358, 363, 368, 378, 379, 381, 385, 387, 391, 392, 396, 397, 401, 402, 406, 407, 411, 412, 416, 431, 438.

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Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

NEW commemorative stamps issued by the colonies are few and far between, for our Colonial Office, for reasons known only to itself, keeps a tight rein on such matters. Some colonials are wont to say that Whitehall would be better employed minding its own business. Fortunately the Dominions take care to manage their own postal matters, with the result that from time to time collectors' hearts are gladdened by some attractive set, such as the "bantams" of South Africa, the Health stamps of New Zealand and the "Victory" issue of Canada.

And before we go any further, we would like to mention that all the stamps of this last set are still obtainable at face value in the Philatelic Bureau at Ottawa, so it is not correct to call them obsolete; moreover, some of the prices asked for certain values are altogether above their worth. For instance the 16 c. Air Express stamp is being offered at almost 10/- for a used copy. A most absurd price, and later on buyers at this figure are going to regret their purchases. Collectors with patience should be able to buy the whole set used for the same money.

To revert to Dominion commemorative or special stamps, news is now to hand that New Zealand will again issue a pair of Health stamps; these were due on 9th October. Once again they are being printed in England, and the two British princesses again figure on them, but this time both appear on each stamp, and as far as can be judged by an advance illustration, they should at least prove as attractive as last year's issue, which sold in record quantities. More than three million of each stamp were sold, resulting in a net profit of over £20,000. Alas for the opportunities our own authorities are passing up!

Eire is another country, whose stamps appear in Part I of the catalogue, which believes in commemorative stamps, though as one collector put it, not in attractive ones. Her latest is one with a face value of 2½d., issued to commemorate the centenary of the death of Brother Rice, founder of the "Order of the Christian Brothers of Ireland." There has been a certain amount of criticism about the designs of recent Irish commemorative stamps, but when all is said and done, these are at least designs and not doodles, such as those issues which have been prepared in London for various French Colonies.

A number of collectors seem worried about the possibility that they will miss the boat, or the bus, when the forthcoming Jamaica commemorative set is issued, and certain advertisements have not helped matters. Let it be said here and now, that there will be plenty for everybody, when the set does appear, which will not be for some time yet, and there is no need whatever to put any money down now; moreover, when the set does come out it should not cost more than a guinea.

The "Daily Mail" recently carried an interesting



story regarding the efforts Germany had been making to fake stamps for political purposes. They had worked on the British coronation design reproduced here. M. Stalin had been substituted for Queen Elizabeth, and among other changes Stars of David had been substituted for the crosses at each of the top corners. Incidentally not all readers may know just what those two crosses are supposed to represent. Believe it or not they are attempts at suggesting the Union Jack, so if you make a botch at school of a drawing, don't despair, for if it is bad enough, it may have a market value. Still it is a bit rough on the poor old Union Jack.

Europe continues to pour out stamps; Germany's contribution during 1943 was said to be 37, and we illustrate one of the regular issues. It will be interesting to see which part of Germany will not be using similar stamps by the time this appears.

There is all kinds of news about the stamps that are being printed in England for use in the newly liberated territories in Europe, and the time is getting close when stamps that have been issued over there will begin to trickle our way, if they have not started already. Their very attractiveness will make them tempting to collectors in Great Britain, but we have already warned readers against paying the fancy prices which will undoubtedly be asked at the start.

A Swiss philatelic paper states that during the past two years more than 1,500 new postage stamps have been issued in Europe alone; and one can only say that at the rate stamps are being issued by these countries, sheer weight of numbers will have a most serious effect on their collection, for the most avid collector, with a pocket full of money—and we are certainly not all like that—will simply not be able to keep up. Far better stick to our own colonials.

Recent printings of Barbados have resulted in two new perforation varieties. The 2d. and 4d. stamps have been emitted with perforation 14, and as both can be purchased for about 9d. collectors will be well advised to buy their copies at once, for when these stamps are again printed they may well revert, as did the 3 c. British Guiana, to their original perforation.

Speaking of British Guiana, there is interesting news about the stamps of this country, in the October Bulletin of the Crown Agents for the Colonies. They announce the preparation of two new values, a \$2 purple and a \$3 brown, and the design is to be similar to the obsolete 60 c. pictorial stamp of King George V. This shows a picture of that wonderful lily *Victoria regia*, which has leaves like shallow vats, strong enough, it is claimed, to support a small baby without sinking into the water in which it grows. Further printings are advised also of British Solomons and Gilbert and Ellice Islands, and as these may result in perforation changes, spaces for the present set should be filled as soon as convenient. Pence spent wisely on such things, mean shillings later on.



The Art of Shipbuilding—(Continued from page 378)

different parts of the hull. When withdrawn from the furnace they are red hot, and are dragged on to large multi-holed steel tables where they are shaped by bending them round steel templates which are held by a succession of steel pegs inserted in the holes of the table. The frames are also bevelled and then marked off and punched for rivet holes. Before leaving the platers' shed the necessary angle brackets, to which the deck beams will eventually be fitted, are riveted on the frames.

On the slip the frames are carefully placed in position by large cranes, and form an enormous skeleton. The frames are temporarily connected together on the slip by pitch pine beams about 20 ft. long and about 6 in. square, known as "ribbands"; these hold the frames together in a fore-and-aft position until the hull is plated. The riveting of the lower ends of these frames to the ship's floor completes this stage of the construction.

Transverse beams are now fixed in position by the cranes and riveted to the angle brackets on their respective frames. The deck beams are supported in the centre of the hull by vertical girders spaced at certain fixed distances.

The stem bar and the stern frame are brought along about this stage and fitted in position. The stern frame is a massive steel forging which carries the rudder and propeller brackets. It will be appreciated that in large ships the handling of this very weighty mass presents no easy problem, as regards slinging and fixing in position.

Now we proceed with the clothing of the huge skeleton with steel plates—in other words, the shell plating is commenced. The plates are cut and punched to suit previously made wooden patterns or templates which have been "lifted" from the actual position on the ship's hull where they will be placed. In doing this the plater clips light wooden laths to the vertical frames of the hull, nails the laths together, and marks off the rivet holes with a rod dipped in white paint and pushed through the rivet holes in the frames, thus marking the lath. The template is then unclipped from the frames and taken to the platers' shed. Here, massive steel plates up to 40 ft. in length and 1½ in. thick, are cut to shape in the shearing machines, and the rivet holes marked off and punched as described above. If distorted during working, the plates are put through mangles and straightened.

The plates are then ready to be conveyed to the hull and temporarily fixed in position on the frames by nuts and bolts. After lining up the holes, and reaming, if necessary, the plates are eventually riveted in position. Plates are attached in horizontal rows, or "strakes" as shipbuilders term them, extending the whole length of the ship. The topmost line of plates is referred to as the sheer strake, the lowest line of plates is called the keel strake, and so on; plating begins at the keel and works up the side of the ship and also from the centre of the ship outwards; that is forward and aft.

Stamp Collecting—(Continued from page 391)

pictorial stamps these are in two colours. The 1 a. value, reproduced here, is in black and brown and shows the Rameswaram Temple, Madras. Other subjects include the famous Taj Mahal, Agra, a Jain Temple in Calcutta, and the Golden Temple of Amritsar. The 8 a. value shows a pagoda in Mandalay, Burma, for at that time Burma was included within the Indian Empire.

In the next series of stamps the authorities turn to a very suitable subject for stamp design, the means by which mail is transmitted. These very interesting designs, of which three are reproduced on page 391, actually came in a mixed George VI portrait and pictorial issue in 1937. Four lower values to 1 a. and six higher values from 1 r. to 25 r. were portrait stamps, the rupee values being larger than the others. The intervening values, from 2 a. to 12 a., showed mail being carried by a runner, in a bullock cart,

in a tonga, or high-wheeled cart drawn by horses, by camel, in a mail train, a steamer, a motor lorry and an aeroplane, the last an Armstrong-Whitworth "Ensign." Later issues have again been portrait stamps. These are of unusual design, the portrait having a white background with a narrow border, horse-shoe shaped or square, and in one case with no border at all.

"Typing Letters Many Miles Away"—

(Continued from page 373)

London machine. Now even if there were no person in the Liverpool office, Mr. A knows that the Liverpool machine is ready to receive a message, and he commences typing. Presuming Mr. B in Liverpool reads the letter and is ready to reply, he throws a switch which reverses the whole process, in order to send back his written answer. The London machine receives and types it. Thus Mr. A can read an answer to a letter he sent to Liverpool a few minutes previously!

In addition to the machines described, there are those which print messages on tape, known as ticker-tape. These machines are used for simultaneous reception of messages in Fire Stations, News Agencies, Police Stations, etc. The British Post Office is a large user of both types of machine, and many great business houses have installed them. In time, no doubt, they will be in use all over the world.

The Air Forces of the United States—

(Continued from page 364)

better than poor second-rate airmen or engineers—were not so good in North Africa in 1942 and quite useless over France in 1943. But new and warworthy types came along and older types were modified and the airmen have put up a magnificent show, as I have seen for myself. (To be continued)

COMPETITION RESULTS**HOME**

May "Tunnels" Contest.—1st Prize: J. E. Porter, Blackburn; 2nd Prize: W. Quemby, Sutton; 3rd Prize: B. Brown, Stanmore. Consolation Prizes: F. Mills, Kearsley; G. Roberts, Liverpool 11.

May "Photographic" Contest.—1st Prizes, Section A: F. G. Reynolds, Sidcup. Section B: H. W. Jones, Gabalfa. 2nd Prizes, Section A: S. S. Pethybridge, Newton Abbot; Section B: R. W. Hennessey, Ickenham. Consolation Prizes: A. W. Bull, Beeston; L. M. Booth, Richmond; B. Priestley, Silcoates School, Nr. Wakefield; J. P. Taylor, Newcastle.

June "Railway Quiz" Contest.—1st Prize: H. Pearce, Aughton; 2nd Prize: F. Mills, Kearsley; 3rd Prize: R. Nicholson, Sheffield 10. Consolation Prize: F. Linton, Mirfield.

June "Photographic" Contest.—1st Prizes, Section A: L. M. Booth (Mrs.), Richmond; Section B: J. E. Downes, Whaley Bridge; 2nd Prizes, Section A: B. Chunlindra, Cornwall; Section B: I. Scott, Leeds 7. Consolation Prizes: P. Milne, Whyteleafe; H. W. Jones, Gabalfa; S. S. Pethybridge, Newton Abbot; H. G. Brown, Stanmore; R. E. Haddock, Chesham.

June "Code Words" Contest.—1st Prize: G. H. Fairchild, Brighton 6; 2nd Prize: D. Belleini, Sunbury-on-Thames; 3rd Prize: J. V. Poole, Long Eaton. Consolation Prizes: D. R. Linton, Mirfield; R. Clark, Chippenham; M. Codling, Gravesend.

July "Holiday Drawing" Contest.—1st Prize: R. G. B. Willis, Darwen; 2nd Prize: B. A. Smith (Miss), Chorlton-cum-Hardy; 3rd Prize: H. Davies, Hove 3. Consolation Prizes: P. Wood, Edmonton; S. Noble, Bridge-of-Weir; D. Clamp, Measham.

Competitions! Open To All Readers

A Locomotive Figureword Contest

In the diagram on this page there are seven rows, each consisting of seven blank spaces, and in our main contest this month the spaces are to be filled with letters that make up the names of seven locomotive parts when read horizontally. To each letter is given a number in alphabetical order, A being represented by the figure 1, B by the figure 2, and so on down to Z, the value of which is 26. When these figures are substituted for the letters, the numbers in each row must add up to the horizontal totals marked on the right, and the numbers in the vertical columns must give the totals shown underneath.

Readers are given a start by the insertion of the letter E in the first row. The value of this letter is 5, and the first row has to be completed by letters making up the name of some locomotive part beginning with E, which contributes 5 to the first horizontal total of 76 and to the first vertical total of 59.

Competitors should copy the diagram out on a sheet of paper, and should fill this in with letters satisfying the conditions of the contest. The diagram reproduced

on this page must not be cut out; if this is done the entry will be disqualified. In the event of a tie for any one of the prizes the judges will take novelty and neatness into consideration.

As usual there will be two sections, one

E								76	HORIZONTAL TOTALS
								79	
								96	
								83	
								77	
								56	
								79	
59	65	68	67	61	91	127			
VERTICAL TOTALS									

for Home readers and the other for Overseas. In each of these sections there will be three prizes of 21/-, 10/6 and 5/- respectively, and Consolation Prizes of 2/6 each. Entries should be addressed "Locomotive Figureword Contest, Meccano Magazine, Binns Road, Liverpool 13." The closing date in the Home section is 31st December; that in the Overseas section is 30th June, 1945.

What Meccano Parts Are These?

Many words seem to be capable of two or more meanings, especially those for which an engineering or technical use has been found. Many of the names of Meccano Parts belong to this class, and some of these can be twisted into meaning something very different from that first thought of by model-builders. For instance, Digger Buckets can be transformed into Australian vessels and Flywheels into insect turns.

We are using this as the basis of a contest that all readers should find interesting. Below we give 12 clues that lead directly and easily to the names of Meccano Parts that will be well known to every reader, just as insect turns would lead to flywheels in the example already given, and the entrants in this contest are asked to find from these clues what parts are indicated.

Here are the 12 clues: 1. Seasonal cuts. 2. Crawling things. 3. Cleaning machines. 4. Boys uncontrolled. 5. Odd folks. 6. Musicians on the road. 7. Turns in the wilds. 8. Building that goes to sea. 9. Food wages. 10. Superior, ringing and queer. 11. Windblown snow. 12. Sign gets ready to fight.

When the parts represented have been found, all that is necessary is to make out a list of them on a postcard, giving in each case first the part number and then the name. The prizes will be awarded for the best lists received, and in the event of a tie for

any of the prizes the judges will take into consideration the neatness and novelty of presentation.

There will be the usual two sections in this contest, for Home and Overseas readers respectively, and in each there will be three prizes of 21/-, 10/6 and 5/- respectively, together with consolation prizes for efforts that miss one of the principal awards, but are deserving of recognition. Entries should be addressed "Meccano Parts Puzzle, Meccano Magazine, Binns Road, Liverpool 13." Closing dates: Home Section, 31st December; Overseas Section, 30th June, 1945.

November Photographic Contest

This month's contest is the 11th in our 1944 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions: 1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed: "November Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13." There will be separate sections for Overseas readers, and in each section prizes of 15/- and 7/6 will be awarded. Closing dates: Home Section, 30th November; Overseas Section, 31st May, 1945.

Fireside Fun

Father: "Here, Johnny. Sixpence for your money box."

Suspicious Son: "What for, dad? After one of my oranges?"



"Fancy wanting to go to the circus when your Uncle George is here!"

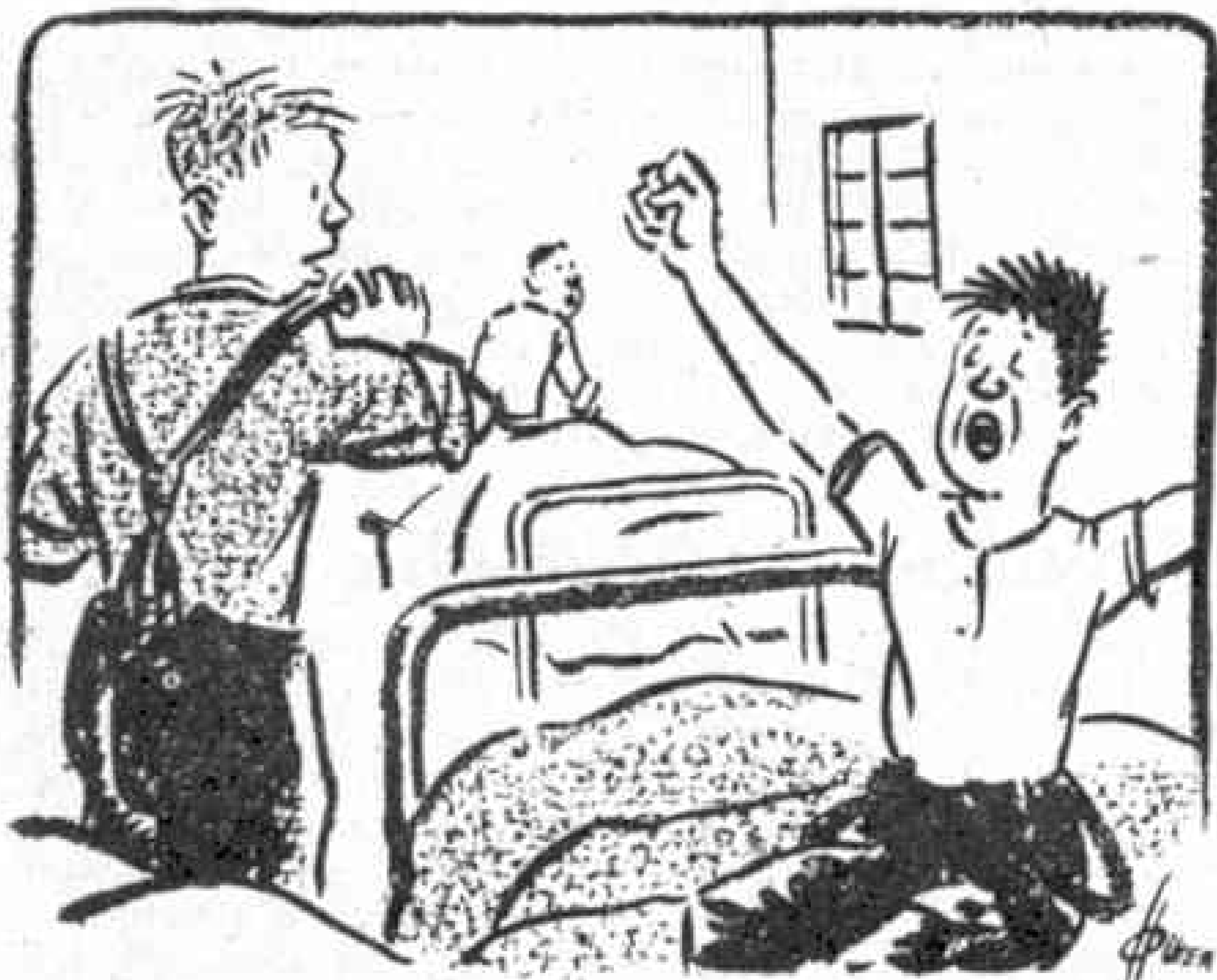
Smith started on his fifth pork chop and seventh potato.

"You sure like your food, Smith," murmured Brown admiringly.

"Not particularly," replied Smith. "It just happens that I am passionately devoted to bicarbonate of soda."

"Why is your car painted red on one side and blue on the other?"

"It's a great idea," explained the speed demon. "You should hear the witnesses contradicting each other when I'm before the court."



"I slept like a top last night."

"Sounded more like a sawmill to me."

THIS MONTH'S HOWLER

Trigonometry is when a man marries three wives at the same time.

BRAIN TEASERS KEYWORD WANTED

Here is an unusual addition sum that would be easy if the figures represented by the letters were given.

C	L	A	N	S
		B	A	N
S	C	R	A	N

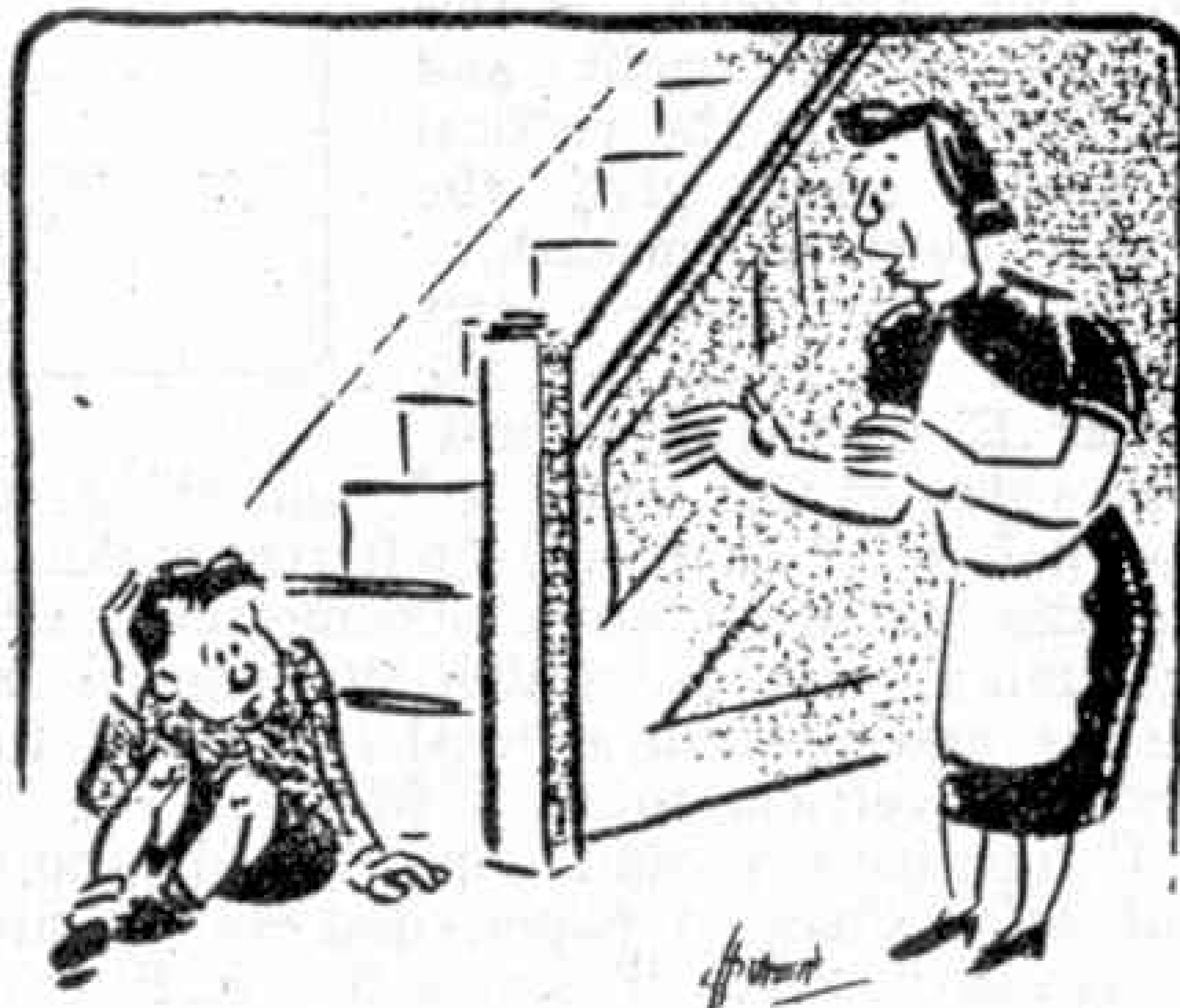
A	G	A	I	N

The puzzle is to find the figures and the keyword, the 10 letters of which are represented by the numbers 1 to 9, with 0 for the final letter.

P.J.C.

DO YOU KNOW THIS?

Most general knowledge questions usually turn out to be general ignorance questions, either because they are chosen as traps or because very few people trouble to note things exactly and fully. Here is one of the second type. The roads of England are given letters and numbers, the letter A being used for the first class roads. Can you say where roads A1, A2, A3, A4 and A5, the five principal roads of England, begin and end? Write your answer down before you look up the details in the book.



"Gracious Tommy, did you miss a step?"

"Nothing so lucky, Mum. I hit every one!"

AEROPLANES AND MOTOR CARS

After these puzzles we want something easy, so here is an example of that good old favourite, the jumble. The following words represent aeroplanes or motor cars, all of American make: CLABK OWWID; BEADSTROKE; POTHUMYL; VARENGA; TRIBALERO; CADPRAK. What are they?

SOLUTIONS TO LAST MONTH'S PUZZLES

The four words required in our first puzzle last month are RIPEST; SPRITE; STRIPE; PRIEST. The "easy" word in the second puzzle is PRODUCTION.

The solution to the match puzzle is simple, but we have no doubt that it would elude many readers, especially if they were looking for something intricate! All that is necessary is to make a second triangle, of the same size as the first, with the second set of three matches, and to place it in an inverted position over the first, so that a six-pointed star is obtained. It will then be seen that in the centre of the figure is a hexagon, with six triangles spaced around it.

Finally we come to the roundabout reversing puzzle. The number required is 18. In the statement of the puzzle it should have been said the product multiplied by itself gives a number that has the same two figures reversed. Adding the two figures together gives 9, which on squaring produces 81.

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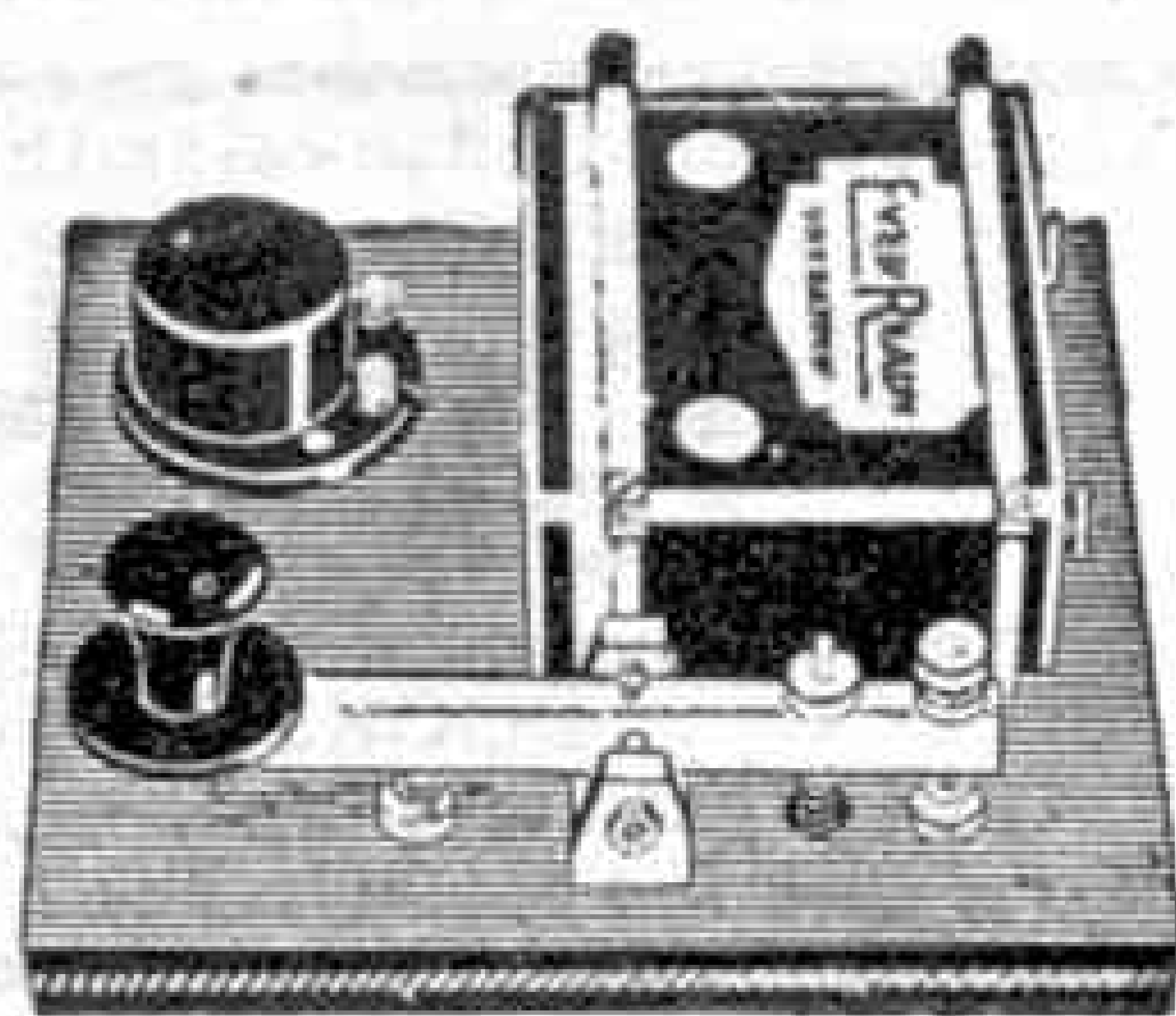
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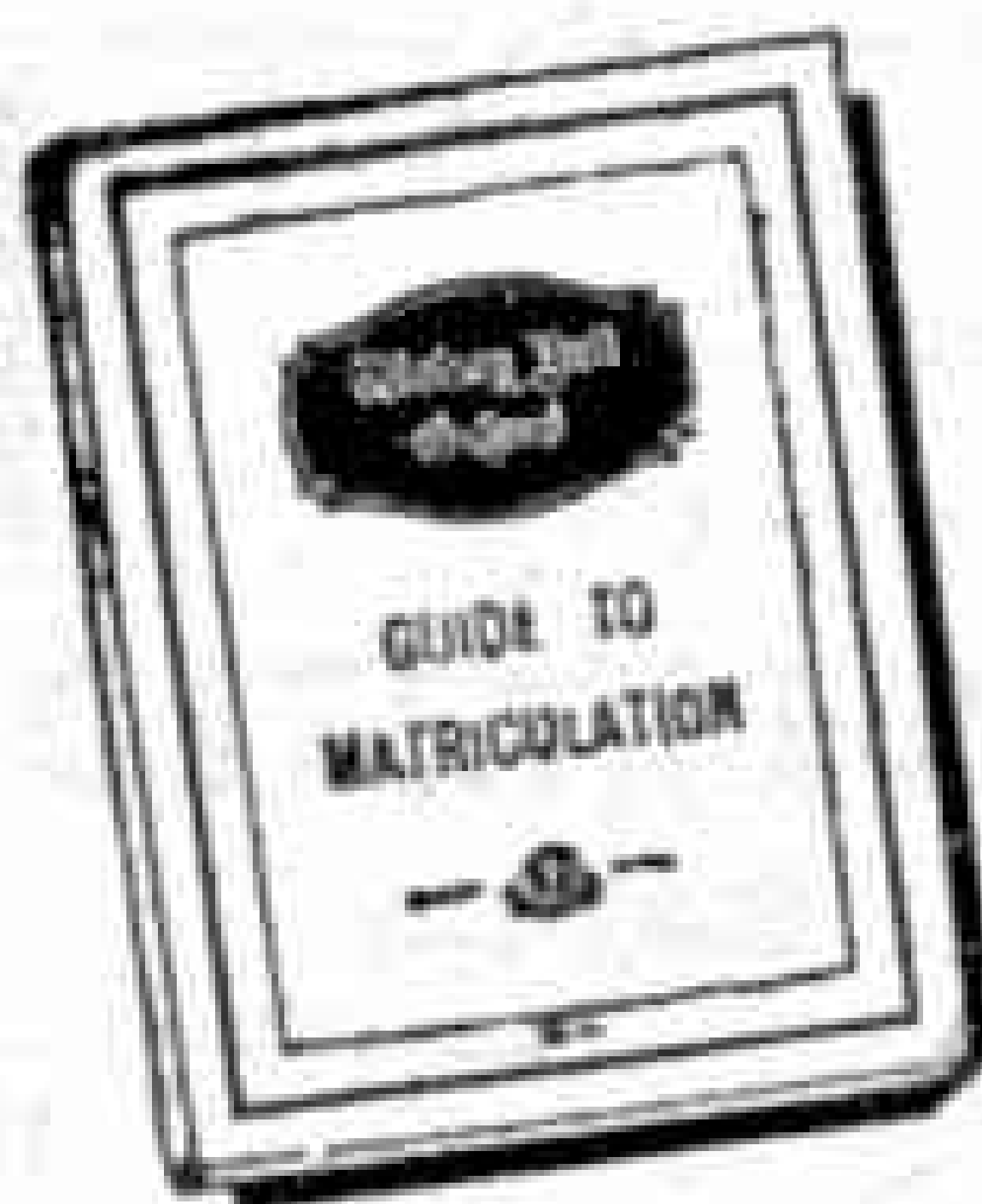
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(See also pages 390 and 392)

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